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## The effect of non-fibre carbohydrate on *in vitro* NDF disappearance of various ruminant feeds

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**Introduction** Type of supplemental carbohydrate provided in conjunction with forage has been suggested to be a factor that might impact the effect on NDF disappearance (Fondevila *et al.*, 2002). Of particular interest in this regard is the relative impact on fibre disappearance of supplementing with sugars versus starch (Arroquy *et al.*, 2005). The aim of the present study was to elucidate the impact of type of supplemental NFC (starch or sucrose) on *in vitro* NDF disappearance of lucerne, sugar beet pulp or wheat bran.

**Materials and methods** Experimental feed samples were lucerne, wheat bran, and sugar beet pulp. Samples were ground using a Willey-mill to pass 0.75mm screen, and dried at 80°C for 48h. Non-supplemented or non-fibrous carbohydrate (starch or sucrose) supplemented samples were incubated in a medium prepared as described by Arroquy *et al.* (2005). The supplementation was carried out as 70mg/g DM of feed samples of starch (St) or sucrose (Su) or a 1:1 composition of them (St+Su). 45ml of medium were distributed into 100ml bottles containing 1g of feed samples. Then, each bottle was inoculated with 5ml of strained rumen fluid and finely bubbled with CO<sub>2</sub>. Three bottles for each treatment were incubated for 24, 48, and 96hrs at 39°C. Then, bottle contents were filtered through a 22µm filter, and NDF of the unfiltered medium was determined as described by Van Soest *et al.* (1991). Data of the disappearance rate of NDF were analysed using general linear model procedure of SAS (2003), with Duncan's test for the comparison of means (P< 0.05).

**Results** The effect of NFC supplementing on NDF disappearance of lucerne, sugar beet pulp, or wheat bran have been shown in Table 1. *In vitro* NDF disappearance of lucerne was significantly decreased by supplementing with Su or St (p< 0.05). While, it was not appear when sugar beet pulp was incubated. A significant effect of starch on *in vitro* NDF disappearance of wheat bran was recorded within 24hrs incubation. At 96hrs incubation, NDF disappearance of wheat bran was significantly decreased when St, Su or St+Su was added to the medium (p< 0.05).

**Table 1** *In vitro* NDF disappearance (g/ Kg) of lucerne, sugar beet pulp or wheat bran supplemented by starch, sucrose or starch +sucrose.

Incubation time (h)	Feed	Non-supplemented	NFC sources			SEM <sup>1</sup>	P <sup>2</sup>
			Sucrose*	Starch**	Sucrose +starch***		
24	Lucerne	175.4 <sup>a</sup>	81.9 <sup>b</sup>	105.3 <sup>b</sup>	61.3 <sup>b</sup>	6.24	< 0.01
48	Lucerne	187.1 <sup>a</sup>	101.7 <sup>b</sup>	119.9 <sup>b</sup>	116.9 <sup>b</sup>	4.41	< 0.01
96	Lucerne	345.0 <sup>a</sup>	204.7 <sup>bc</sup>	274.8 <sup>ab</sup>	181.3 <sup>c</sup>	6.94	< 0.01
24	Wheat bran	129.7 <sup>a</sup>	122.2 <sup>a</sup>	182.2 <sup>b</sup>	197.2 <sup>b</sup>	5.87	< 0.05
48	Wheat bran	317.3	377.3	332.3	347.3	5.87	0.12
96	Wheat bran	474.8 <sup>a</sup>	369.8 <sup>b</sup>	287.3 <sup>b</sup>	317.3 <sup>b</sup>	8.12	< 0.05
24	Sugar beet pulp	286.2	214.8	200.6	279.1	8.29	0.20
48	Sugar beet pulp	371.9	314.8	336.2	336.2	6.85	0.37
96	Sugar beet pulp	357.6	393.3	357.6	329.1	7.70	0.47

<sup>a,b,c</sup> within a row, means without the common superscript letter differ.

Sucrose was added as 70 mg/ g DM; \*\* Starch was added as 70 mg/ g DM; \*\*\* 35 mg/ gDM of sucrose and 35 mg/ g DM of starch was added <sup>1</sup> Standard error of mean <sup>2</sup> P-value

**Conclusions** Results of the present study indicated that *in vitro* NDF disappearance of lucerne and wheat bran, as a fibrous feedstuffs, are influenced by the NFC. *In vivo* work reported by Heldt *et al.* (1999) indicated that supplementation with starch had a more negative effect on forage fibre disappearance than did simple sugars. Based on the data obtained in the present study, it was concluded that, generally, NFC supplemented fibrous feedstuffs had lower *in vitro* NDF disappearance when samples were incubated for 96hrs. In addition, the effect of NFC on the amount of NDF disappearance resulted from different type of feedstuffs is not similar and it might be related to the nature of the incubated feeds.

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