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## Introduction

Improving fibre digestion can allow greater energy extraction from home grown feeds and reduce the reliance on bought in alternatives. Additionally, improving N retention can lower the environmental impact of animal production therefore supporting greater sustainability on farm.

Previous *in vitro* research found the addition of rapidly fermentable carbohydrates in the form of a molasses-based liquid feed can significantly improve fibre (NDF) digestibility (Palmonari *et al.*, 2018).

## Aim

The aim of this research was to investigate this effect of fermentable carbohydrates *in vivo* and examine additional animal health and efficiency benefits of incorporating a molasses based liquid feed into a dairy cow ration.

This study investigated the effect of incremental diet inclusion of Regumix, a 27% crude protein, 53% sugar molasses-based liquid feed produced by ED&F Man, in a lactating dairy cow ration on fibre digestibility, nitrogen utilisation and rumen pH.

## Methodology

Four mid-lactation Holstein dairy cows were randomly assigned to one of four dietary treatments in a 4x4 Latin Square experiment with 4-week periods.

Measurements of milk yield and composition, diet intake and digestion, and urinary N excretion were obtained using total faecal and urine collection over the last 5 days of each period.

Reticular pH was measured using a wire-less rumen pH bolus.

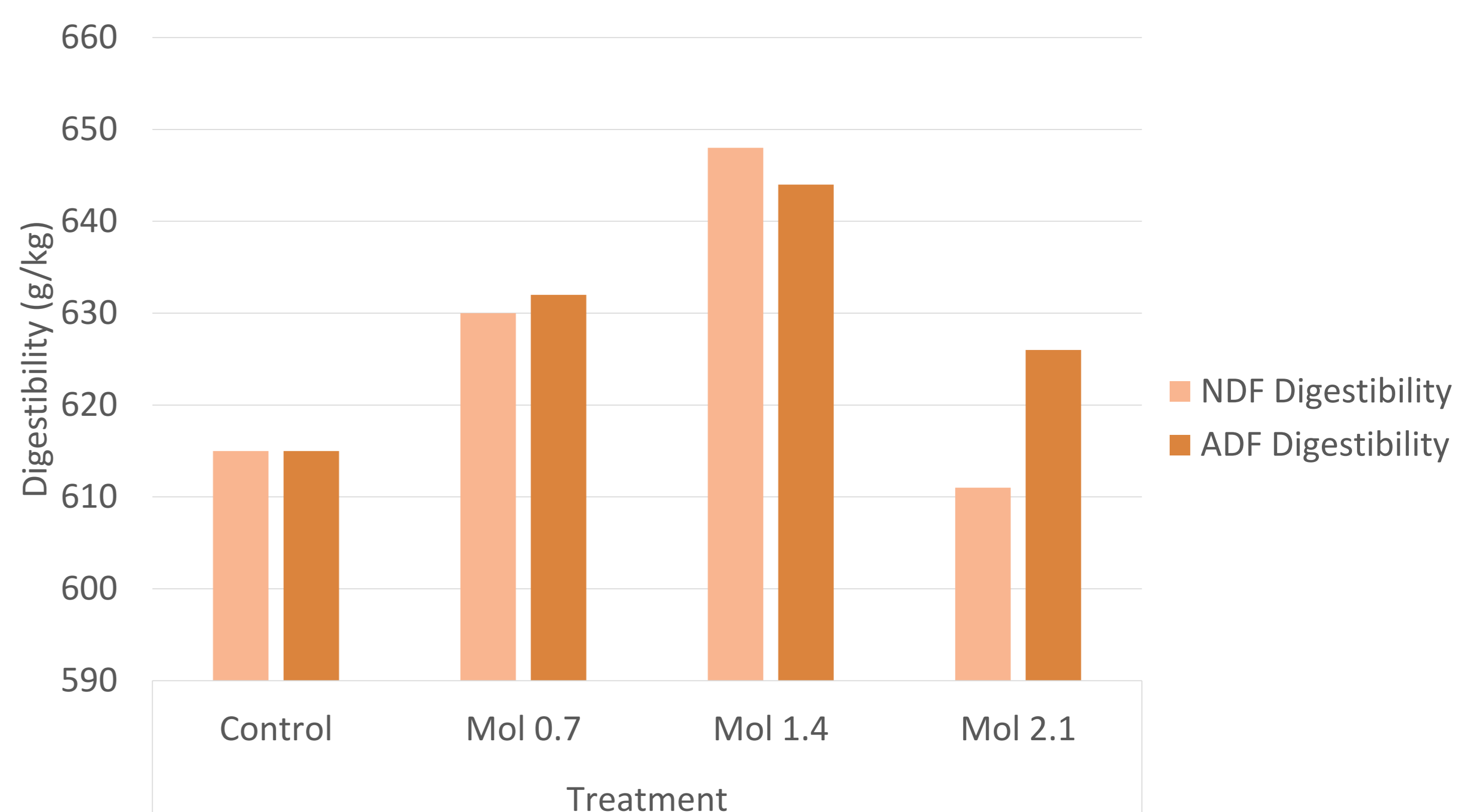
Cows were fed a control diet composed of grass silage, maize silage and concentrate blend. Treatment diets were formulated to achieve Regumix intakes of 0.7, 1.4 and 2.1kg/d at a DM intake of 22kg/d. The inclusion of Regumix proportionally diluted the other diet components resulting in isonitrogenous and iso energetic diets with differing concentrations of carbohydrate fractions.

**Table 1. Composition of the 4 Total Mixed Rations (TMR)**

Treatment	% of diet DM			
	Control	Mol 0.7	Mol 1.4	Mol 2.1
Concentrate blend	40.76	39.89	38.96	38.15
Regumix	0.0	2.14	4.41	6.41
Grass Silage	23.69	23.18	22.65	22.17
Maize Silage	35.55	34.79	33.98	33.27
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

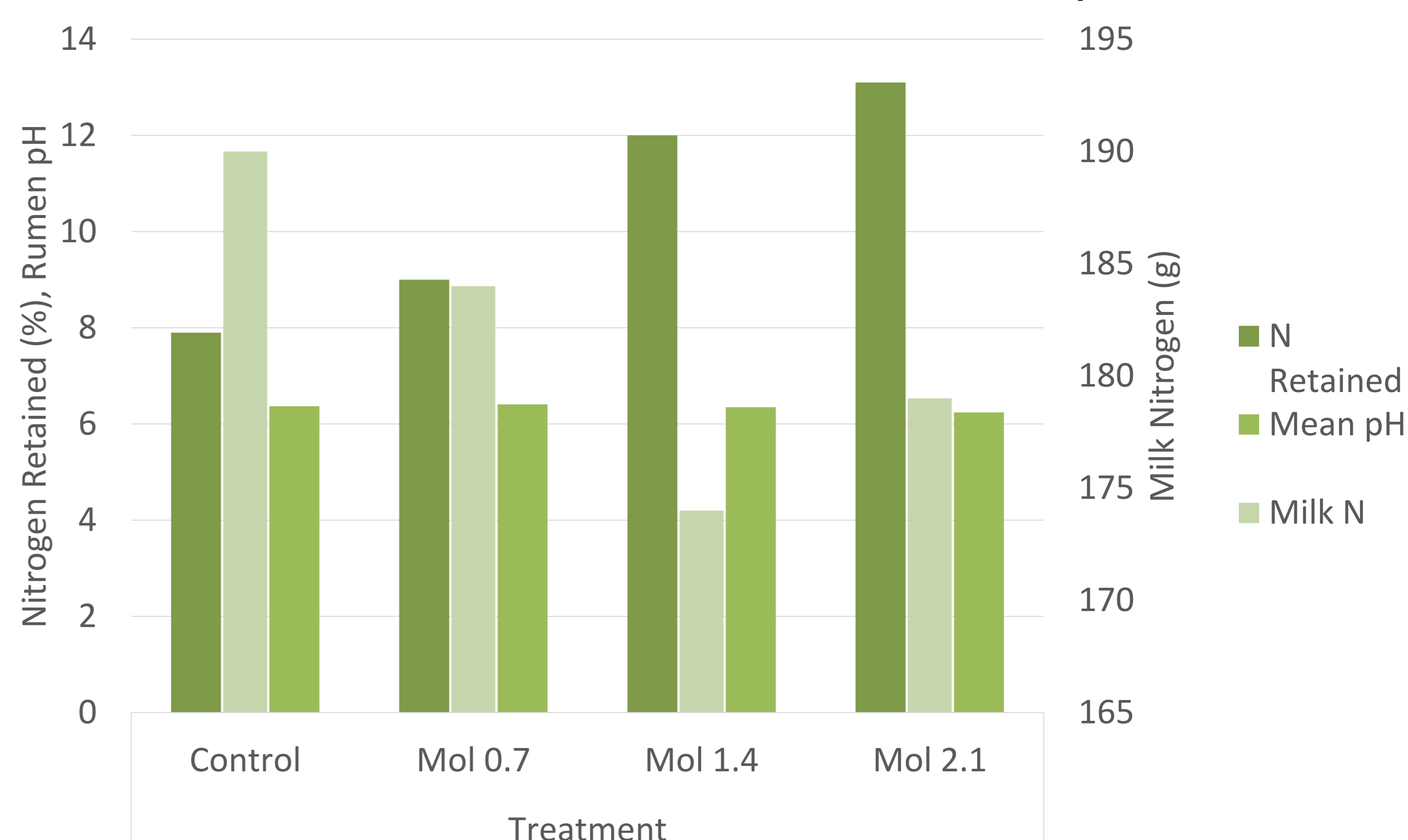
## Results

- Increasing inclusion of Regumix increased neutral-detergent fibre (P<0.024) and acid-detergent fibre (P<0.088) digestibility in a quadratic manner, with an increase in NDF and ADF digestibility over control of 33 (P<0.052) and 29 (P<0.043) g/kg respectively for the 1.4kg/d Regumix inclusion.



**Figure 1. The effect of increasing Regumix inclusion on NDF and ADF digestibility**

- N retention increased numerically (P<0.234) with increasing Regumix feeding rate and milk N output numerically decreased (P<0.331), but the effects were not significant.
- There was no effect of treatments on rumen pH.



**Figure 2. The effect of increasing Regumix inclusion on N retention, milk N and rumen pH**

## Conclusions

- Supplementing a lactating dairy cow ration with fermentable carbohydrates (in the form of Regumix) increased fibre digestion without negatively affecting the rumen environment.

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**References:** Palmonari, A., Mammi, L., Holder, P., Fernandes, L. and Formigoni, A. (2018) *Effect of differently rapidly fermentable carbohydrate sources addition on in vitro neutral detergent fibre (NDF) digestibility*. [Poster] Exhibited at: BSAS, Edinburgh, April 2019. Total Dairy Conference, Stratford-upon-Avon, June 2019