Effects of methionine analogues on rumen fibrolytic activities and fibrolytic microorganisms

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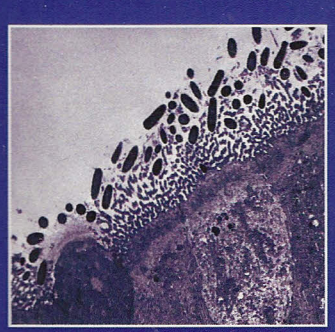

Gut Microbiology:

new insights into gut microbial ecosystems

7th Joint Symposium organised by the **Rowett Institute of Nutrition and Health,** University of Aberdeen, Scotland (UK) & the **Institut National de la Recherche Agronomique,** Clermont-Ferrand-Theix (France)

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Effect of the type and level of concentrate substitution with feed-blocks on the ruminal fermentation of diets based on alfalfa hay in batch cultures

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Ruminant's production in the Mediterranean area is limited by pastures scarcity. Concentrates based on cereals are frequently used to overcome that limitation but increase in cereals prices is creating a new problem. However greenhouse cultures are very important in that area and wastes could be an alternative in ruminants feeding. With the aim of evaluating the potential of greenhouse wastes to replace cereals in ruminant diets the effects of the type and level of feed-blocks including barley or tomato, cucumber and a mixture (1:1) of tomato:cucumber on the ruminal fermentation of diets based on alfalfa hay were evaluated by using batch cultures of mixed rumen microorganisms. The different feed blocks substituted 0, 50, 75 and 100% of a commercial concentrate. The inoculum was obtained from 3 rumen-fistulated Granadina goats (47±2.0 kg). The type of feed-blocks did not affect the ruminal fermentation parameters after 24 h ($P \geq 0.695$) or 72h ($P \geq 0.174$) of incubation. However the concentrate substitution level affected ($P \leq 0.044$) pH, gas, CH4 and total VFA production, acetic/propionic ratio and molar proportions of propionic and butyric acids after 24 h of incubation. The kinetic of gas production was evaluated by following an exponential model $y = A [1 - e^{-c \cdot t}]$, and asymptote of gas production and fermentation rate was also affected ($P < 0.001$) by the concentrate substitution level. In conclusion, feed-blocks type did not compromise the ruminal fermentation and 50 and 75% concentrate substitution with feed-blocks seem to be the optimal levels. Barley could be potentially substituted by greenhouse wastes in ruminant diets.

P3/34/0102

Effects of methionine analogues on rumen fibrolytic activities and fibrolytic microorganisms

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Methionine analogues, HMTBA and HMBi (2-hydroxy-4-(methylthio)-butanoic acid and its isopropyl ester, respectively) are used as methionine sources in dairy rations to improve milk production and milk protein content. It has been suggested that these components could also increase feed utilisation by improving fibre degradation in the rumen. The aim of this study was to investigate the effects of HMTBA and HMBi on rumen activities and rumen microbial populations, with a special emphasis on fibrolytic activities and fibrolytic microorganisms.

Six rumen-cannulated Holstein cows fed a wheat/hay (50/50) diet were used in a double Latin square design. Treatments were: supplementation or not with HMTBA or HMBi at 14 g equivalent methionine per day. Each period of treatment consisted in 3-week adaptation followed by 8 weeks of experimentation.

Under our experimental conditions, supplementation with HMTBA and HMBi had no effect on rumen carboxymethylcellulase and xylanase activities, in sacco degradability of maize grain and maize silage, ammonia and total volatile fatty acid concentrations. However, the acetate/propionate ratio was significantly decreased. The concentrations of total protozoa (counted by microscopy), total bacteria and two fibrolytic bacteria *Fibrobacter succinogenes* and *Ruminococcus albus* (quantified by qPCR), were not affected by the supplementations. Conversely, the concentration of the fibrolytic bacterium *Ruminococcus flavefaciens* significantly increased in the presence of both methionine analogues. In addition, *R. flavefaciens* was also found to better colonize maize silage and maize grain with HMBi. The modes of action of HMTBA and HMBi on fibrolytic populations still require further investigation.