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Session 76 Poster 17

Short-chain fatty acids transporters expression in ruminal epithelium of growing rams depends on the source of butyrate used in a diet

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High intake of concentrate and resulting high short-chain fatty acids (SCFA) production in the rumen may exceed the ruminal epithelium ability to absorb them. In order to enhance ruminal epithelium function, butyrate supplementation in the diet can be used. The aim of the study was to compare two sources of dietary butyrate: commonly used sodium butyrate (SB) and tributyrin (TB), as an alternative to SB, when those were supplemented in a high-concentrate diet of growing rams. Thirty-two rams (30.6 ± 2.5 kg; 11-14 months of age) were allocated into one of four treatments and fed ad libitum diet with: 1) low inclusion of concentrate (22.5% of diet dry matter (DM); L); 2) high inclusion of concentrate (60% of DM; H); 3) H with SB (3.2% of DM; H+SB); and 4) H with TB (2.93% of DM; H+TB). After three weeks, the rams were slaughtered and SCFA transporters mRNA expression in ruminal epithelium was analyzed. Targeted genes included: monocarboxylate transporter 1 (MCT1), putative anion transporter-1 (PAT1) and downregulated in adenoma (DRA). The pre-planned contrasts were used for data analysis: L vs. H, H+SB and H+TB; H vs. H+SB and H vs. H+TB. In atrium ruminis, DRA expression was higher for L compared to H treatments (P=0.03). In ventral rumen, MCT1 expression was lower for L compared to H treatments (P=0.02). When it comes to butyrate sources, H+SB compared to H treatment tended to increase PAT1 (P=0.09) and decrease DRA (P=0.06) expression, while TB had no impact on investigated transporters mRNA expression (P≥0.14). Unlike SB supplementation, the TB supplementation does not affect the SCFA transporters expression in the ruminal epithelium.

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Relationship between the natural 15N enrichment of plasma and feed conversion efficiency in fattening young bulls

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The natural $_{15}$N enrichment of animal proteins over the consumed diet (Δ_{15}N) has been related to feed conversion efficiency (FCE) in beef cattle and therefore can therefore be used as a proxy for selection and classification of animals. The relationship between Δ_{15}N measured in the whole plasma and FCE has been studied in beef fattening young bulls under different feeding regimes (2 concentrates x 2 forages). The Δ_{15}N values from plasma samples of 52 male calves were obtained at 117 d (M1) and at 201 d (M2) of age. Daily body weight and concentrate intake was obtained from automatic scales and feeders, respectively. Individual forage intake and faecal production was estimated with double marker from faecal samples, while excreted N was estimated from spot urinary creatinine and N contents of urine and faeces. The FCE on M2 was calculated as average daily gain (from 173 to 229 days of age) divided by total DM intake (FCE_DM) or by retained N (FCE_N). The Δ_{15}N values in plasma samples at M1 were poorly and negatively correlated with FCE_DM (-0.32, $p<0.05$) and FCE_N (-0.22, $P<0.05$) whereas the Δ_{15}N values of the samples at M2 were moderately and negatively correlated with FCE_DM (-0.61, $p<0.05$) and FCE_N (-0.61, $P<0.05$). Animals were classified into three groups according to its FCE on M2 (HIGH_FCE, MED_FCE, and LOW_FCE). Animals belonging to HIGH_FCE had lower Δ_{15}N in M1 than LOW_FCE animals for both FCE_DM (4.30‰ vs 4.52‰, $P<0.05$) and FCE_N (4.34‰ vs 4.50‰, $P<0.05$) traits. In the case of Δ_{15}N in M2 the difference was only observed for FCE_DM. In conclusion, our finding confirms that the natural $_{15}$N enrichment of plasma over the diet is a predictor of feed efficiency but the relationship depends on the specific used trait.