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Czech Journal of Animal Science

Nutritive value of maize and sorghum silages: fibre fraction degradation and rumen microbial density in buffalo cows

Sarubbi F., Chiariotti A., Baculo R., Contò G., Huws S.A.:

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Sorghum could be a potential substitute to maize in Mediterranean buffaloes feed in order to improve sustainability of buffalo-based agriculture, due to its reduced water and nitrogen requirements

fed primarily. The aim of this study is to obtain information on rumen degradability of fibre fraction of maize and sorghum silages and to investigate the relationship between degradability and rumen microbial populations. As such four cannulated buffalo milking cows were fed *ad libitum* two different iso-energetic and iso-proteic diets based on maize silage (MS) and sorghum silage (SS). Based on plate counts, values of cellulolytic bacteria showed to be higher within the rumen of SS fed buffaloes compared to MS fed buffaloes (4.4×10^9 vs 1.9×10^9 cfu/ml, $P < 0.05$), on the contrary, those of xylanolytic bacteria (3.2×10^9 vs 1.3×10^9 cfu/ml, $P < 0.01$) were higher in MS possibly due to the different fibre degradability. Real-time PCR of total bacteria, *Fibrobacter succinogenes*, *Ruminococcus albus*, and *Ruminococcus flavefaciens* revealed no statistical difference in their 16S rDNA concentrations between diets. MS and SS were subsequently utilized for a degradability experiment. For this trial three cannulated Mediterranean dry buffalo cows were used (body weight 580 ± 8.5 kg). The MS was found to have an

effective degradability of acid detergent fibre, hemicelluloses, and cellulose which were always lower than SS. Maize neutral detergent fibre degradability and slowly degradable fraction were significantly ($P < 0.01$) higher, on the contrary the immediately degradable fraction was found to be significantly ($P < 0.001$) lower compared with sorghum. The better sorghum relative feed value ($P < 0.001$) was related to the major content of fibre fraction compared to maize. As recommended by the IPCC Guidelines (in IPCC 2006), Tier 2 was chosen to estimate the enteric CH_4 emission factor.

The estimate of methane production is significantly lower in animals eating sorghum rather than maize (63.48 and 103.00 kg CH_4 /head/year respectively, $P < 0.001$). In conclusion, as no difference was observed in animal weight gain and milk yield, rumen microbiota or degradability, it could be possible to substitute MS with SS in buffalo diet.

Keywords:

Italian Mediterranean buffalo; rumen
microorganism; rumen degradability;
silages

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