

Analysis of the impact of select varieties of sorghum [*Sorghum bicolor* (L) Moench] silage on the microbial fermentation profile in the cow rumen – *in vitro* examination

Ewa Pecka-Kielb, * Dorota Miśta, * Andrzej Zachwieja, † Bożena Króliczewska, * Maja Słupczyńska, ‡ Barbara Król, ‡ and Józef Sowiński§

*Department of Animal Physiology and Biostructure , Wrocław University of Environmental and Life Sciences, Norwida 31, 50-375 Wrocław, Poland, † Department of Cattle Breeding and Milk Production, and ‡Department of Animal Nutrition and Feed Science, Wrocław University of Environmental and Life Sciences, Chełmońskiego 38c, 51-630 Wrocław, Poland, §Department of Crop Production, Wrocław University of Environmental and Life Sciences, pl. Grunwaldzki 24A, 50-363 Wrocław, Poland

ABSTRACT

The *in vitro* experiment determined the impact of silage produced from selected varieties of sorghum on the microbial fermentation profile of the cow rumen digesta. The obtained results may influence the replacement of silages commonly used in TMR for cows by the analysed sorghum varieties.

The experiment was conducted in a herd of Polish Holstein-Friesian black and white variety. The rumen digesta was obtained from 10 cows, diluted with buffer and homogenized. Serum bottles were filled with 80ml of homogenised digesta and 1g of one of the following substrates was added: CS – corn silage; GS – grass silage; RS – rye silage; SS1 – sorghum silage (sweet); SS2 - Sorghum silage (grain); SS3 - Sorghum silage (dual-purpose). The serum bottles were flushed with CO₂ and fermented for 8 and 24 hours in of 39°C. After incubation, the fermentation gas was sampled and

analysed using the gas chromatograph in order to determine the concentration and profile of volatile fatty acids (VFA) and gas content – including methane.

Gas production was higher in samples incubated with CS than in the samples containing rye and sorghum silages. In the group of samples where RS was used the production of methane was lower as compared with samples containing CS, GS, SS2. The present study demonstrated the highest production of VFA in samples with grass silage, and the lowest in the samples with sorghum and corn. Additionally, the acetic acid fraction of VFA was lower in the samples with CS as compared with samples containing other substrates.

The analysis of the obtained results demonstrates a lack of negative influence of silages on the products of microbial fermentation in the rumen. The silages of the analysed sorghum varieties may be used in the diet of dairy cows not only as substitutes for both CS, GS.