Influence of different slurry application methods on grass silage quality

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Introduction The silage quality is influenced by many factors. The composition of the forage at ensiling as well as the technique of silage preparation are important. With the application of slurry many clostridia spores are spread to the field and to the forage. According to Lorenz and Steffens (1996) the forage which had been fertilized with a broadcast system had higher butyric acid contents in comparison to a band-spread system. On the other hand, Beck (2011) did not find differences between the two systems. The objective of this study was to compare the effect of different slurry application methods as well as a mineral N fertilizer treatment on the number of clostridia spores and the grass silage quality.

Materials and methods The experiment at Agroscope in Tänikon (535 m a.s.l.) included three different slurry application techniques (broadcast, band-spread and trailing-shoe), as well as a mineral N fertilizer treatment in a small-plot scale (18 m^2, three repetitions per treatment). Slurry (4-5% dry matter (DM) content, 30 kg NH_4-N per ha and cut) and mineral fertilizer (30 kg N/ha and cut) were applied at two times (early: 1-3 days after the preceding cutting; late: 7-10 days afterwards). The forage which contained only grasses was cut five times a year. Samples of the first, third and fourth cut were ensiled in 1.5 l laboratory silos and analysed 90 days after ensiling for silage quality (butyric acid). In addition, DM and nutrient contents, as well as clostridia spores, were determined in the fresh forage.

Results and discussion At the time of ensiling the forage samples had an average DM content of 22, 30 und 33% for the three different cuts. The fermentability coefficients were 42, 45 and 49. The ash and crude protein content amounted to 72, 80 and 77 and 120, 116 and 143 g/kg DM, respectively, and the crude fibre level was 254, 224 and 207 g/kg DM for the three cuts. The number of clostridia spores was relatively low (Fig. 1). The highest values were detected for broadcasted and band-spread, late applied slurry. A reason for the lower number of spores in the late slurry application treatments is that there was less rain between the slurry application and the harvest. Despite the low number of clostridia spores butyric acid was produced during the fermentation process (Fig. 2). Particularly, the silages of the first cut showed in all treatments high butyric acid contents. This is partially explainable with the low DM content. For the third and fourth cut, the highest butyric acid contents were detected for broadcast and late application. These observations confirm the results reported by Lorenz and Steffens (1996).

Conclusions The different slurry application methods influenced the number of clostridia spores on the forage as well as the silage quality. Additionally, the time of slurry

application had an effect on both clostridia values and silage quality.

References

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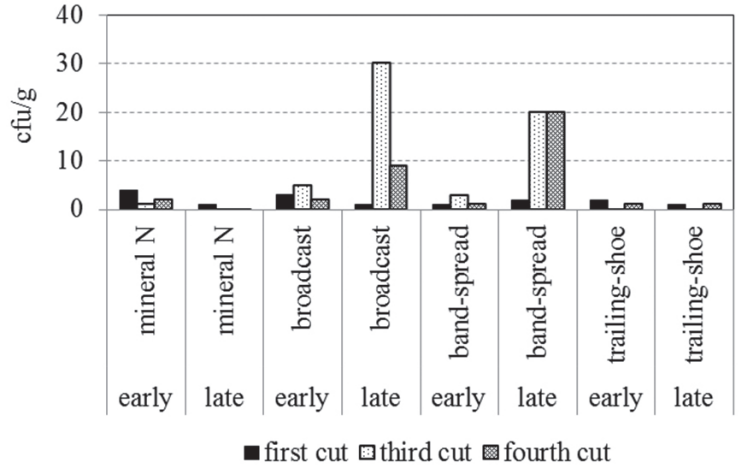

Figure 1 Clostridia spores of fresh forage samples at different application techniques and application timings (cfu: colony format units).

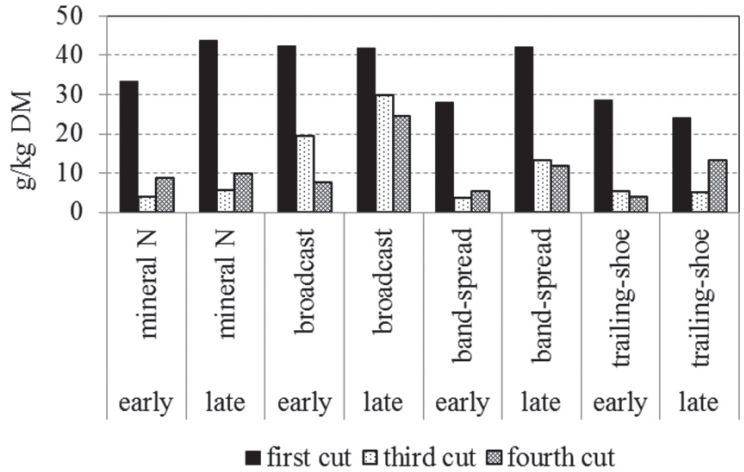

Figure 2 Butyric acid content of the silages at different application techniques and application timings.