

Fermentation and nutrition value of blighted corn silage

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Introduction In the Netherlands in 2007 the corn was infected with blight for the first time on a large scale. Infection of corn silages with Northern Leaf Blight (*H. turcicum*) or with Helminthosporium Leaf Spot (*H. carbonum*) can reduce yield and may effect the quality depending on the time and seriousness of the infection (Caldwell and Perry, 1972; Van Schooten et al., 2009). The objective of this study was to monitor the fermentation characteristics and nutrition value of corn silages which were infected with Northern Leaf Blight or with Helminthosporium Leaf Spot.

Materials and Methods Silages made from blighted corn grown on twelve farms in 2007 were selected for this study. Core samples from the cutting surface of the silages were taken one time during the feedout period. The fermentation characteristics, chemical composition and, nutritional value of the blighted corn silages were quantified and compared with non-infected corn silages.

Results and Discussion Based on farmers observations, blight infections occurred at the end of the ear filling period or just after ear filling. At harvest, 80 to 100% of the stems and leafs were infected. The average whole crop dry matter (WCDM) content of the blighted corn silages was hardly lower than non-infected corn silage (Table 1) and varied from 280 to 360 g kg⁻¹. Although there was a considerable variation the average lactic acid content of the blighted corn silages was equal to the non-infected corn silage. One blighted silage had a very low lactic acid content of 2 g kg⁻¹ (Figure 1). De somewhat higher average acetic and propionic acid content of the blighted corn silage compared to non-infected corn silage was caused by four silages which were treated with an additive, which stimulates the production of acetic acid. The starch content of nine of the 12 blighted corn silages was lower than of non-infected corn silage (Figure 1). The average starch content of the blighted silages was 326 g/kg DM, which was slightly lower than the average of 345 g starch /kg DM in non-infected corn silage. Infection with Northern Leaf Blight or with Helminthosporium Leafspot did not have a negative effect on the NDF digestibility. The average NDF digestibility of the blighted silages was 50.6%, which was slightly higher than the non-infected corn silage.

Conclusions When corn silage was harvested at a normal DM-content of 300 to 350 g/kg, infection with leaf blight had very little effect on fermentation characteristics and nutritional value.

References

- Caldwell D.M. and T.W. Perry. 1972. Nutritional value of blighted corn as silage or as grain. *Journal of Dairy Science* 55: 1302-1304
- van Schooten, H.A., J.A.M. Groten, R. Meier, R.L.G Zom and H.T.A.M. Schepers. 2009. Helminthosporium in snijmaïs. *Animal Sciences Group Wageningen Universiteit en Researchcentrum, Lelystad, Nederland.*

Table 1. Silage characteristics, chemical composition and nutritive value of blighted silage corn (mean \pm SD) compared with non-infected corn silage.

| Item | Blighted silage corn (n=12) | Non infected corn silage |
|---|-----------------------------|--------------------------|
| WCDM (g kg ⁻¹) | 327 \pm 34 | 340 |
| Silage characteristics | | |
| pH (value) | 4,0 \pm 0,2 | 3.9 |
| Lactic acid (g kg ⁻¹) | 17,1 \pm 5,8 | 17.3 |
| Acetic acid (g kg ⁻¹) | 6,7 \pm 4,0 | 4.9 |
| Butyric acid (g kg ⁻¹) | 0,1 \pm 0,1 | 0.1 |
| Propionic acid (g kg ⁻¹) | 0,6 \pm 0,9 | 0.1 |
| Ethanol (g kg ⁻¹) | 3,9 \pm 0,8 | 2.5 |
| Chemical composition | | |
| Crude protein (g kg DM ⁻¹) | 67 \pm 8 | 70 |
| Crude fiber (g kg DM ⁻¹) | 200 \pm 14 | 190 |
| Crude ash (g kg DM ⁻¹) | 37 \pm 3 | 38 |
| Sugar (g kg DM ⁻¹) | 14 \pm 5 | 13 |
| Starch (g kg DM ⁻¹) | 326 \pm 24 | 343 |
| NDF (g kg DM ⁻¹) | 431 \pm 29 | 393 |
| dNDF (%) | 50,6 \pm 1,8 | 49.2 |
| ADF (g kg DM ⁻¹) | 235 \pm 17 | 215 |
| ADL (g kg DM ⁻¹) | 20 \pm 1 | 19 |
| Nutritive value | | |
| dOM (%) | 75,3 \pm 0,9 | 75.3 |
| NEL (MJ kg DM ⁻¹) | 6,6 \pm 0,1 | 6.6 |
| DVE ¹ (g kg DM ⁻¹) | 48 \pm 2 | 51 |
| OEB ¹ (g kg DM ⁻¹) | -39 \pm 6 | -38 |

¹ DVE = available intestinally digestible protein OEB = rumen degradable protein balance

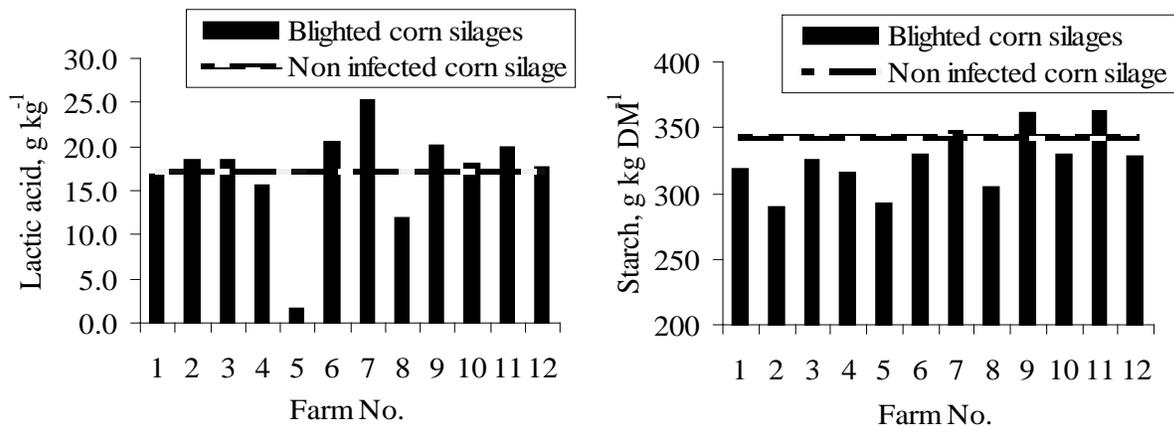


Figure 1. Starch content and lactic acid content of the individual blighted corn silages compared with non infected corn silage