

Evaluation of sweet grain sorghum silage for dairy cows as an alternative to irrigated maize silage

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Introduction Under European dairy cattle rearing conditions, whole plant maize silage is the main part of the dairy cow's diet especially during the winter season. Nevertheless maize production can be limited in some areas because summer rainfall is insufficient and so irrigation is necessary. Grain sorghum hybrids, and especially sweet sorghum types, are potentially of great interest to avoid this water consumption (Lemaire *et al.*, 1996, Legarto, 2000). For this reason we evaluated in 2003 the benefits and limits of a sweet grain sorghum silage for dairy milk production, compared to an irrigated maize silage. We paid particular attention to forage quality and yield, environmental effects and animal performance.

Materials and methods Two ha of each of the 2 hybrids (*Sorghum bicolor* (L) Moench, cv Topsilo and *Zea mays* L., cv Cocagne) were grown in Lusignan under standard farming practice. Irrigation was provided to the corn crop only to prevent summer drought stress. Harvest, storage and feeding of both silages were strictly comparable. Sixteen Holstein-Friesian dairy cows (30.6 kg milk, 635.5 kg BW, 65 d DIM) were paired and assigned to one of the 2 experimental diets i.e. maize silage (MAS) or sweet sorghum silage (SSS) for 15 weeks. Cows were fed the silages individually *ad libitum*. The diets were complemented with concentrates (both diets), cereals (SSS only, 1 kg wheat) or urea (MAS only, 0.05 kg). Forage yield and composition, intake and animal performance were measured.

Results Treatment means are given in Table 1 (crops and forages) and Table 2 (animal performances). Summer rainfall were lower than usual (93 mm between 15 June and harvest date) and maize was irrigated five times to provide 152 mm. Temperature was exceptionally high in August (19 days above 30 °C). Dry matter yield and grain content were lower for sorghum than maize. The SSS was of lower quality than MAS based on fibre content and digestibility. Cows fed SSS had a significantly lower intake than cows fed MAS. However this could be partly related to the lower DM content. SSS cows were also fed grain and so probably lowered silage intake. Milk production and milk protein content were significantly higher with the MAS diet. Neither milk fat content nor body weight changes differed between diet treatments.

Table 1 Crops and forages characteristics

| | SSS | MAS |
|------------------|-----------|-----------|
| Seeding date | 14 May | 24 April |
| Harvest date | 25 August | 28 August |
| S. rainfall, mm | 93 | 93 |
| Irrigation, mm | 0 | 152 |
| DM Yield, t/ha | 11.7 | 18.0 |
| Grain content, % | 10.3 | 44.3 |
| NDF content, % | 49.2 | 40.6 |
| Digestibility, % | 66.3 | 76.4 |

Table 2 Animal performance

| | SSS | MAS |
|------------------|---------------------|--------|
| Silage % of DM | 26.2 [#] | 35.2 |
| Silage DM intake | 13.6 [#] | 17.0 |
| Total DM intake | **18.9 [#] | **22.2 |
| Milk yield | 24.1 [#] | 28.8 |
| Fat content | 4.56 | 4.39 |
| Protein content | 3.05 [#] | 3.25 |
| BW variation, kg | +15.7 | +9.0 |

[#] The effect of the diet was significant (p<0.001)

Conclusions The results of the present study confirm that non-irrigated sweet sorghum is able to provide adequate biomass. It also has a high efficiency for milk production provided its lower feeding value is taken account of and corrected within the total diet (Barriere *et al.*, 2003). This allows water to be either saved or to be more efficiently managed in ruminant rearing areas which experience summer drought. This type of sorghum could become a suitable alternative to maize if its agro-environmental and economic benefits are confirmed.

References

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