

# Impact of maturity stages from different sorghum varieties on fermentation characteristics and leachate losses

Reinhard Resch<sup>1</sup> and Georg Terler<sup>1</sup>

<sup>1</sup>AREC Raumberg-Gumpenstein, Irdning-Donnersbachtal, Austria, [reinhard.resch@raumberg-gumpenstein.at](mailto:reinhard.resch@raumberg-gumpenstein.at)

## Background

- Western corn rootworm (*Diabrotica virgifera*) menace maize.
- Sorghum as alternative crop in temperate regions (Bolsen et al. 2003), because of climate change.
- Little experience on sorghum cultivars and their nutritive value for cattle in Central Europe.

## Conclusions

- Fermentation characteristics of sorghum varieties similar to maize.
- Silage type exhibits low DM content and leachate losses until middle grain maturity (dough).
- Biomass sorghum has low contents of XP and NFC.
- **Grain sorghum as a good alternative to maize!**

## Materials and Methods

- Sorghum cultivation in Hafendorf (R 15°18'40.7"; H 47°27'19.3") from 2016 to 2018.
- Types: i silage (si), ii biomass (bm), iii grain (gr)
- Cultivars: i Aristos (bm), ii ES Harmattan (si), iii RGT Vegga (si), iv NutriGrain (si/gr), v RGT Primsilo (gr), vi RGT Ggaby (gr) compared with maize (Angelo)
- Grain maturity at harvest: i early = late milk to soft dough, ii middle = dough, iii late = hard grain.
- Harvest by sickle bar mower (Fig. 1); manual feed of plants in a single row chopper (Fig. 2); average particle length of approx. 10 mm.
- Ensiling into 60 litre plastic barrels and hermetically sealing via cover plates.
- Storage at AREC Raumberg-Gumpenstein (R 14°06'13.0"; H 47°29'36.9").
- Sampling after four months: barrels were weighed and opened to get samples of silage and leachate.
- Chemical analysis via standardised wet chemical methods (VDLUFA 1976).



Fig. 1 Sorghum harvest in Hafendorf by sickle bar mower. Stubble height approx. 15 cm.



Fig. 2 Manual feed of sorghum plants in a single row chopper (Pöttinger) and ensiling of chopped material into plastic barrels on a forage wagon.

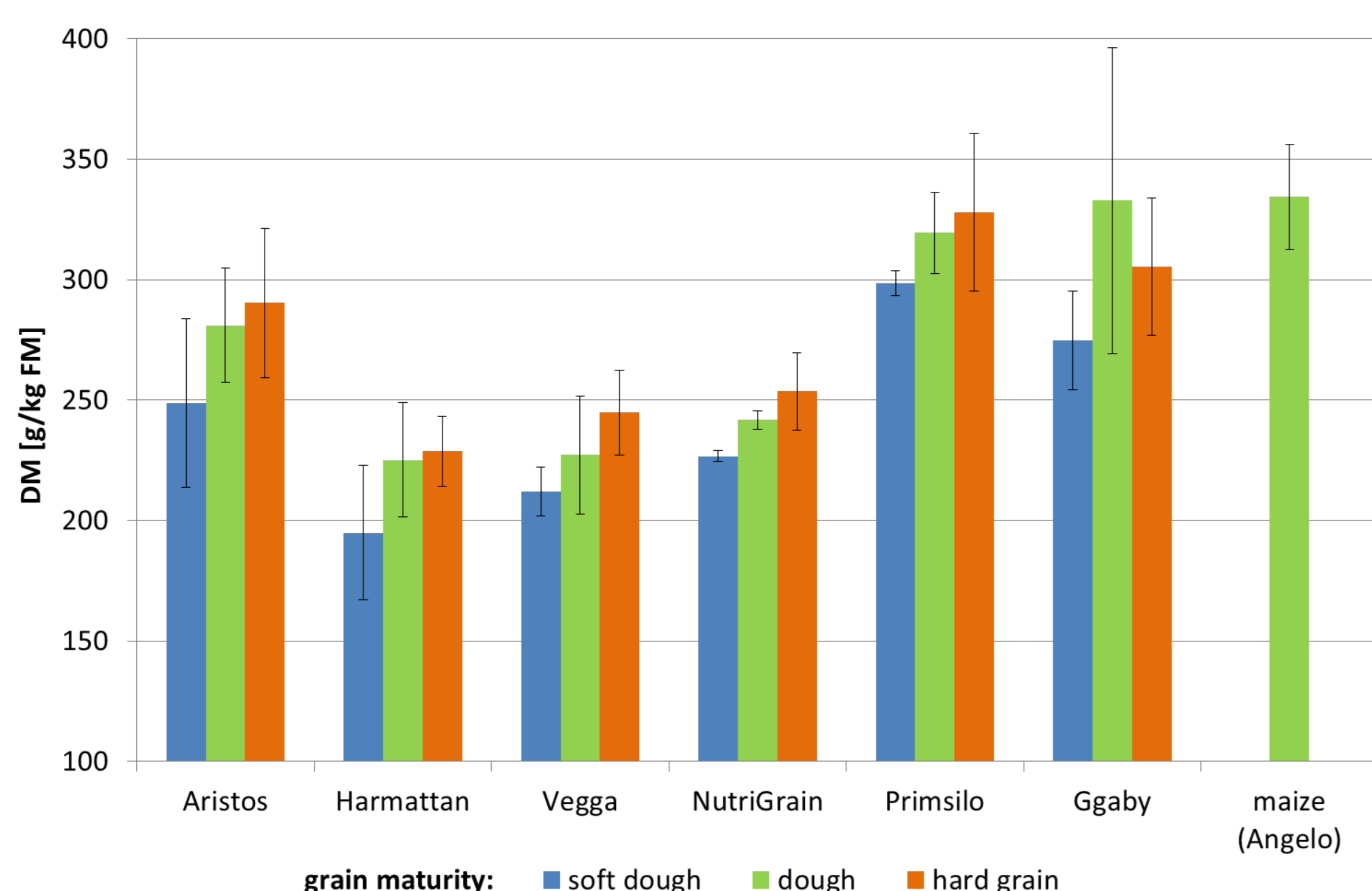


Fig. 3 DM content of silages from various sorghum cultivars at different grain maturities in comparison with maize silage

## References

- Bolsen, K.K., Moore, K.J., Coblenz, W.K., Siefers, M.K. and White, J.S. (2003): Sorghum silage. Silage science and technology, Agronomy 42, American Society of Agronomy, Crop Science Society of America, Soil Science Society of America, 31-94, 609-632.
- VDLUFA, 1976: Methodenbuch Band III – Die chemische Untersuchung von Futtermitteln, inkl. Ergänzungsblätter 1983, 1988, 1993, 1997 [Book of Methods Volume III – Chemical Analysis of Feedstuffs, Additional Sheets 1983, 1988, 1993, 1997], VDLUFA-Verlag, Darmstadt.

## Results

- DM content of sorghum silages, especially of silage sorghum type lower than in maize silage (Fig. 3)
- Leachate production up to 12.4% of total FM predominantly in silage sorghum cultivars.
- Acidification of sorghum was suboptimal at late milk resp. soft dough maturity stage, because of pH level above recommendation.
- High ethanol content (Fig. 4) and percentage of total VOC in sorghum silages.
- Increase of grain maturity caused decreasing contents of some VOC and ammonia.

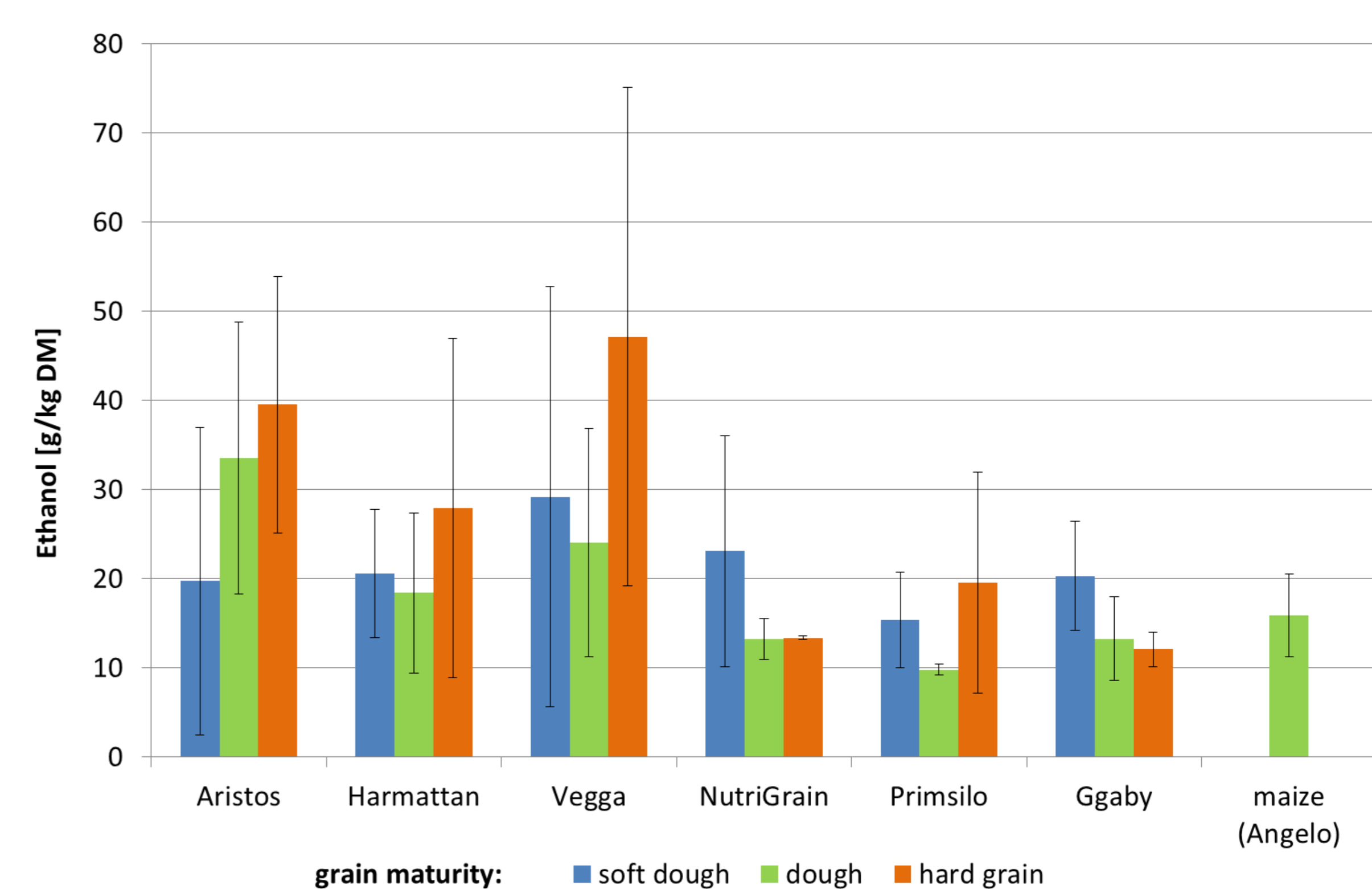


Fig. 4 Ethanol content of silages from various sorghum cultivars at different grain maturities in comparison with maize silage