Presented at Tropentag 2016 in Vienna

Effects of water restriction on quality of goat manure

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Introduction

- Water scarcity is a major challenge for agriculture in tropical and subtropical drylands.
- Wise use of locally available sources of water and nutrients is needed to optimise resource use efficiency.

Research objectives:

- Determine effects of restricted water intake of goats on faecal quality.
- Assess consequences of water intake for utilization of resulting faeces as manure in crop production.

Materials and Methods

- Trials conducted at SQU, Muscat (Oman) in summer 2013 and 2014.
- Six adult male Batinah goats served as experimental animals (Fig. 1).
- Three watering treatments (Fig. 2):
  - Water offered *ad libitum* (100%).
  - Water restricted to 85% of individual *ad libitum* consumption.
  - Water restricted to 70% of individual *ad libitum* consumption.

Fig. 1. Batinah goat (desert breed)

Fig. 2. Animal drinking water

- Quantification and sampling of faeces during three 7-day experimental periods per trial.
- Faeces analysed with standard protocols for concentrations of:
  - Dry matter (DM)
  - Nitrogen (N)
  - Carbon (C)
  - Neutral detergent fibre (NDF)
  - Acid detergent fibre (ADF)

Results

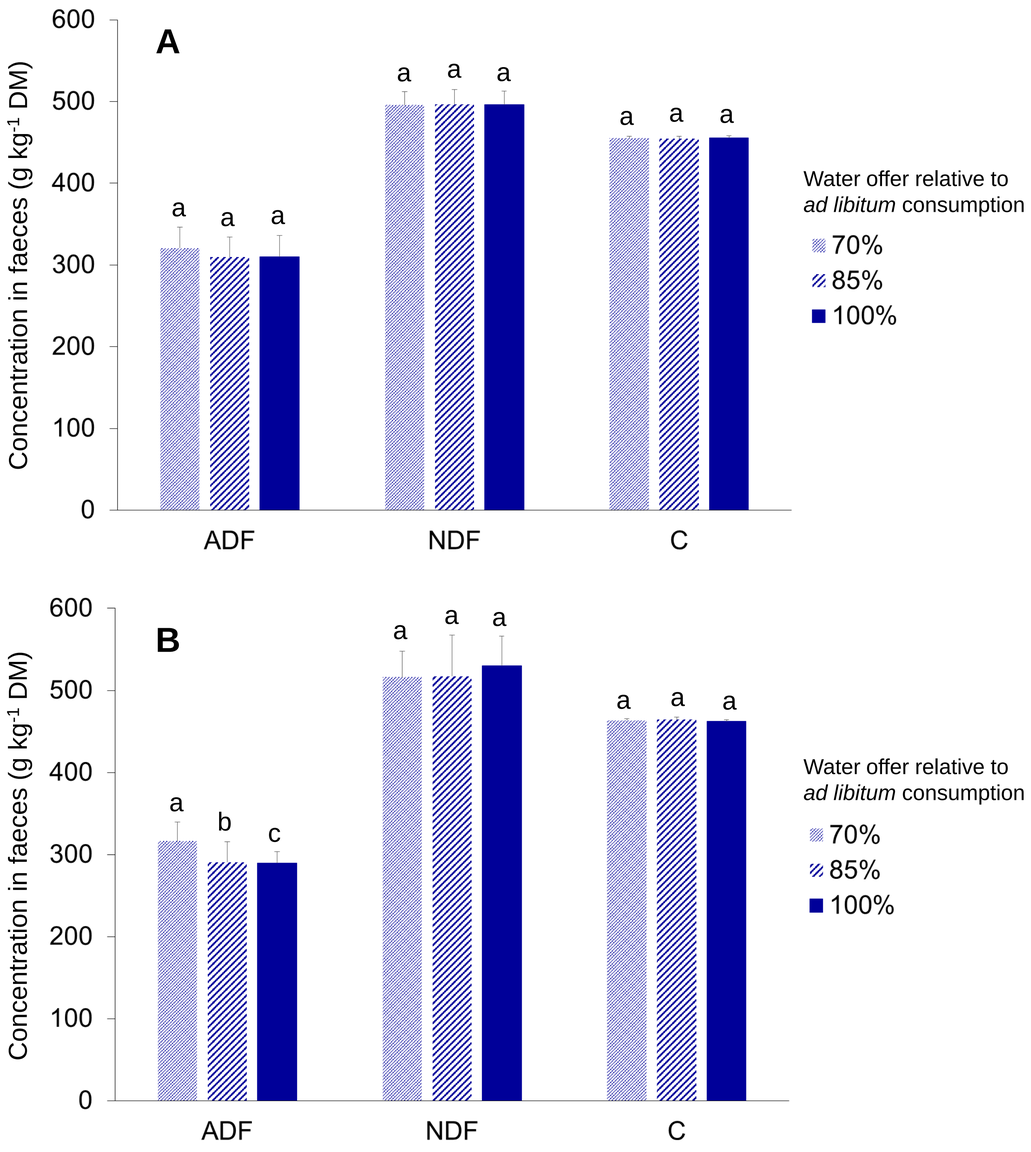

Fig. 3. Quality of goat faeces in 2013 (A) and 2014 (B).
Bars with different letters differ at p≤0.05.

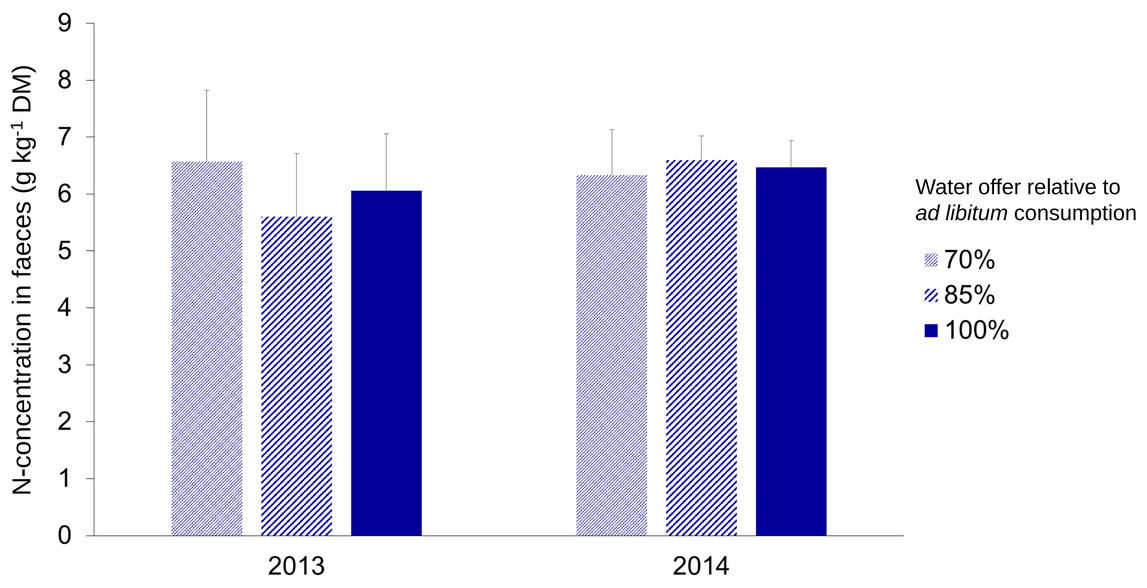

Fig. 4. Nitrogen concentration of goat faeces in 2013 and 2014.

- In both years, faecal NDF concentration decreased with water restriction but this was not significant (Fig. 3A, B).
- In 2014, faeces of water restricted goats had a higher ADF concentration compared to control (p≤0.05; Fig. 3B).
- No effect of water restriction was observed for the N concentration in faeces (Fig. 4).

Conclusions

- High ADF concentration in faeces of water restricted goats may stabilize soil organic matter when applied as manure.
- ADF consists of slowly decomposable organic C that causes short-term N immobilisation.

→ Immediate N-losses occurring directly after manure application may be reduced.

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Financially supported by DFG