

Impacts of headspace volume and overhead-pressure measurement frequency on specific methane yields in *in vitro* anaerobic digestion using micro-BMP method

Himanshu^{1,2}, Markus Voelklein², Pdraig O’Kiely¹ and Jerry Murphy²

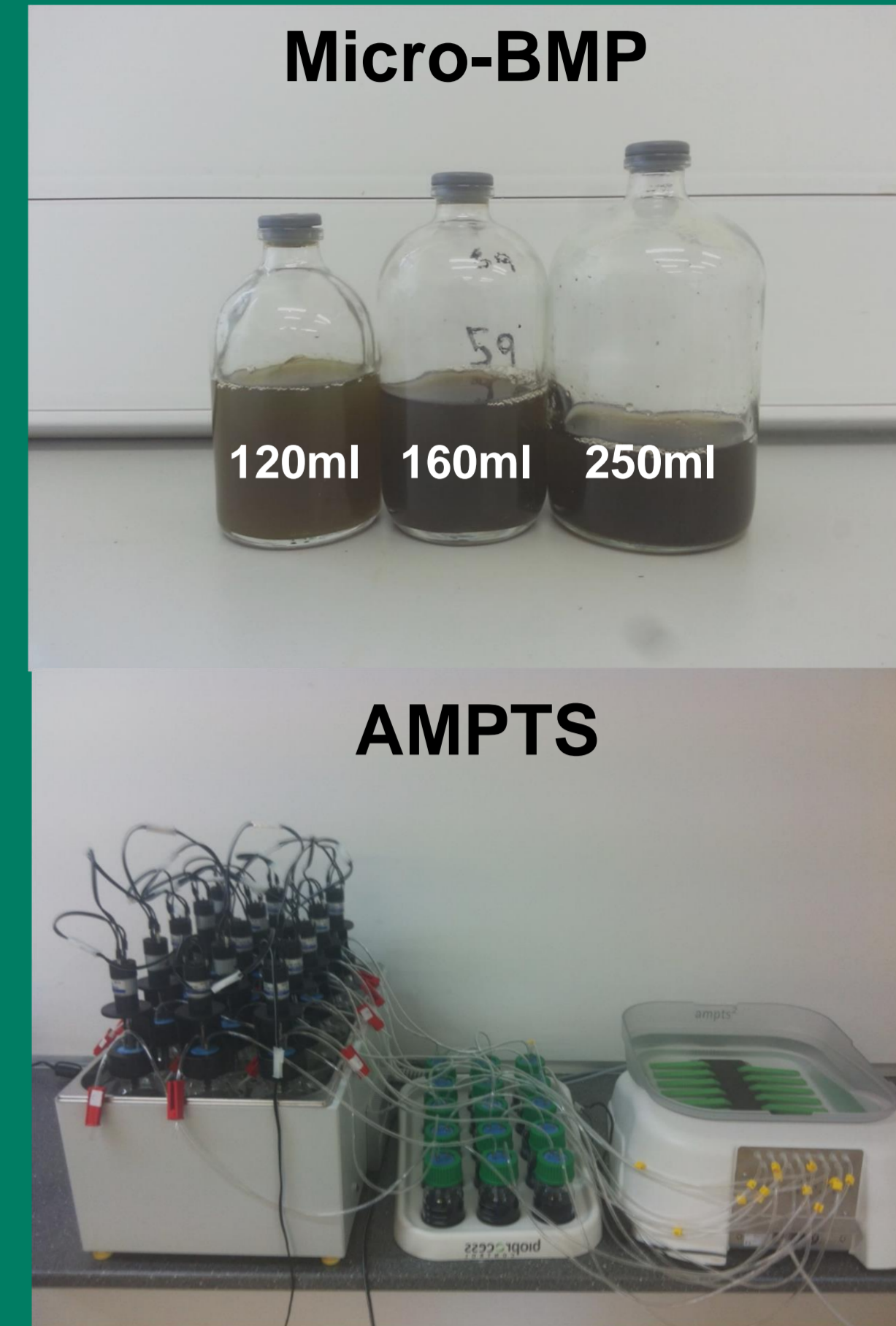
1 - Animal & Grassland Research and Innovation Centre, Teagasc, Grange, Dunsany, Co. Meath, Ireland
2 - School of Engineering, University College Cork, Cork, Ireland

Introduction

- The two most common methods for a BMP test are
 - **Volumetric** - the pressure is kept constant and the volume of biogas is measured by a displacement volume device e.g. AMPTS II®
 - **Manometric or micro-BMP** - the volume is kept constant and an increase in overhead-pressure (OHP) is measured, usually, by a portable pressure transducer
- VDI 4630 guideline has no recommendation for headspace volume and time intervals for OHP measurement

Methodology

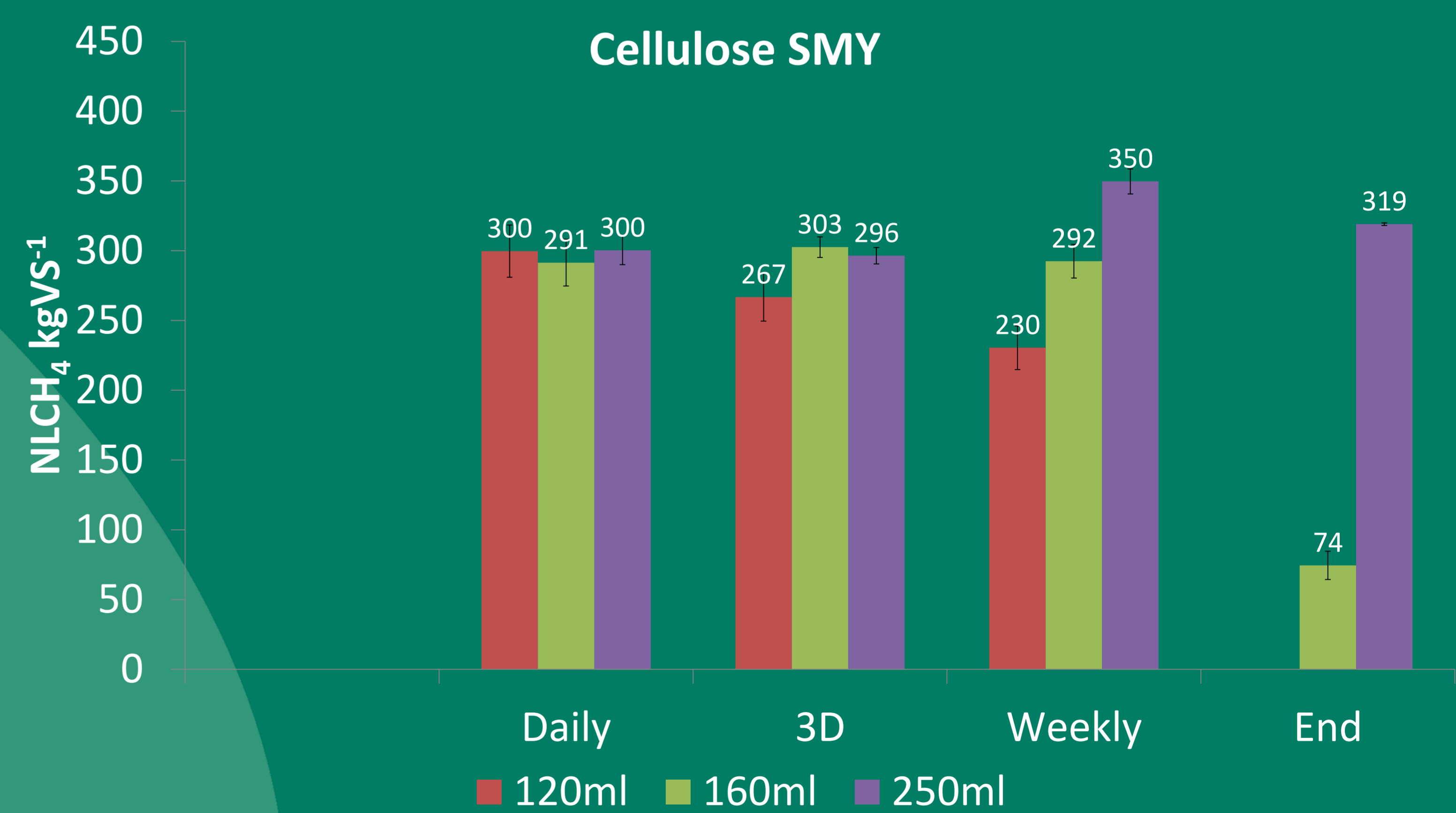
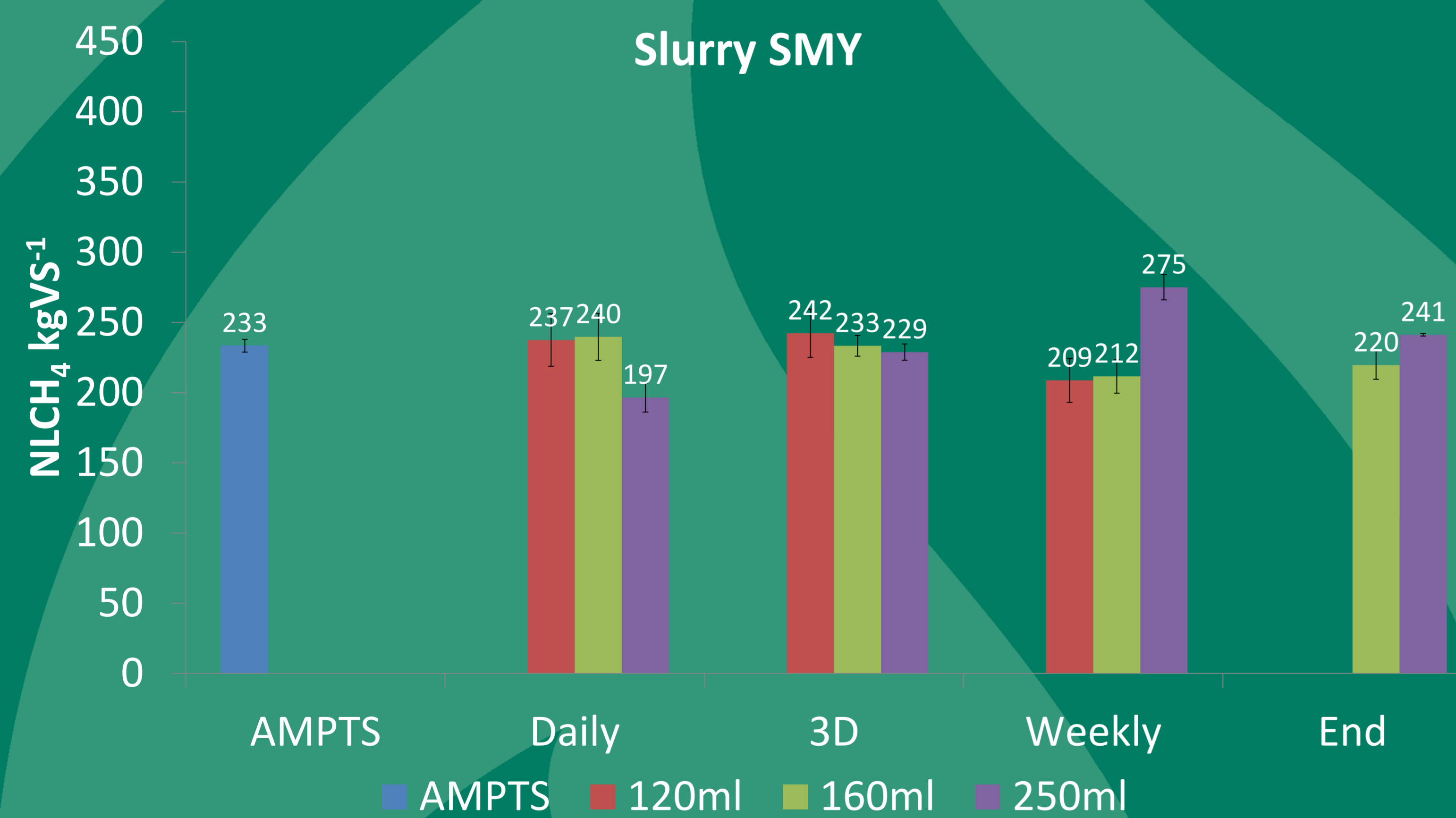
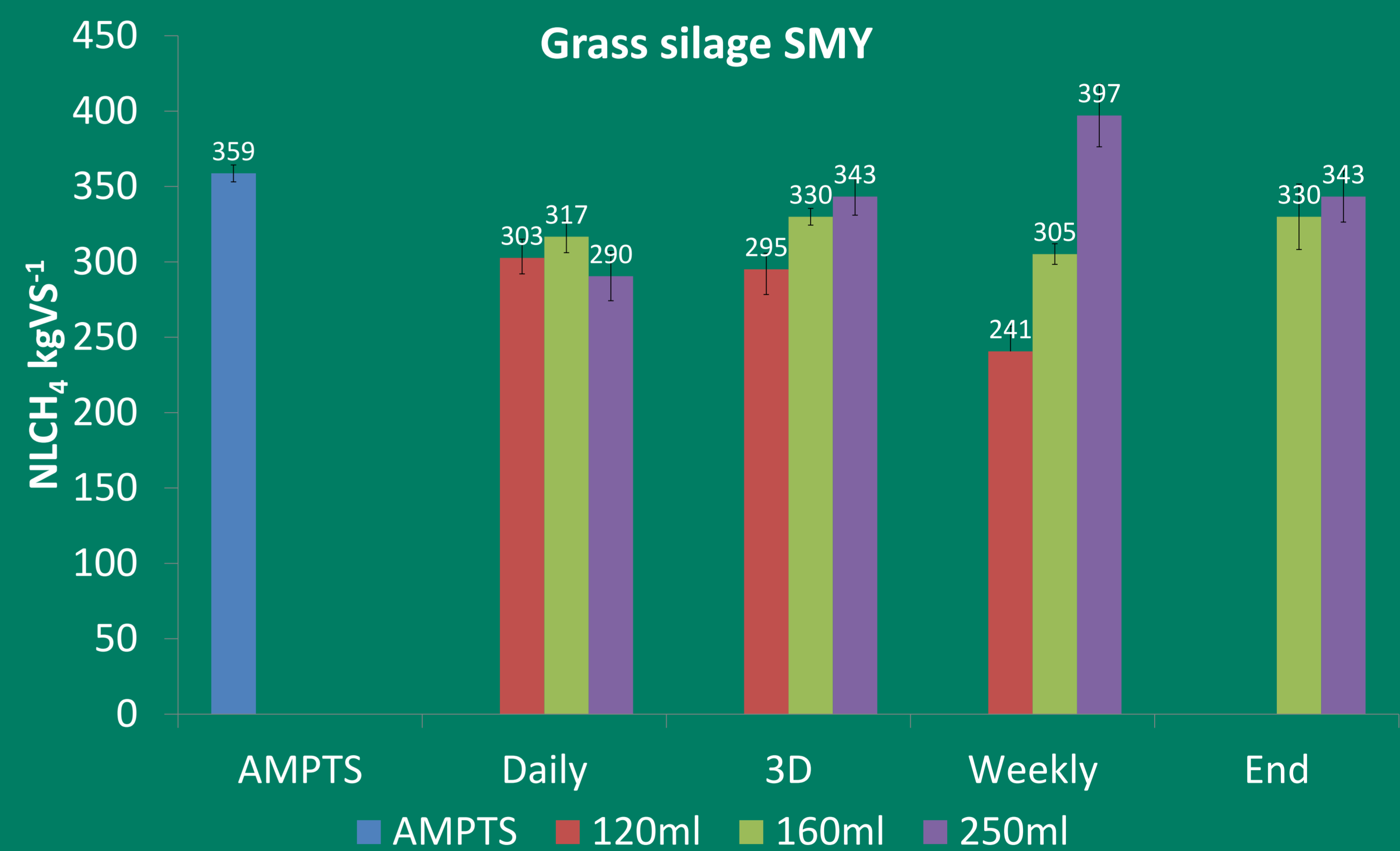
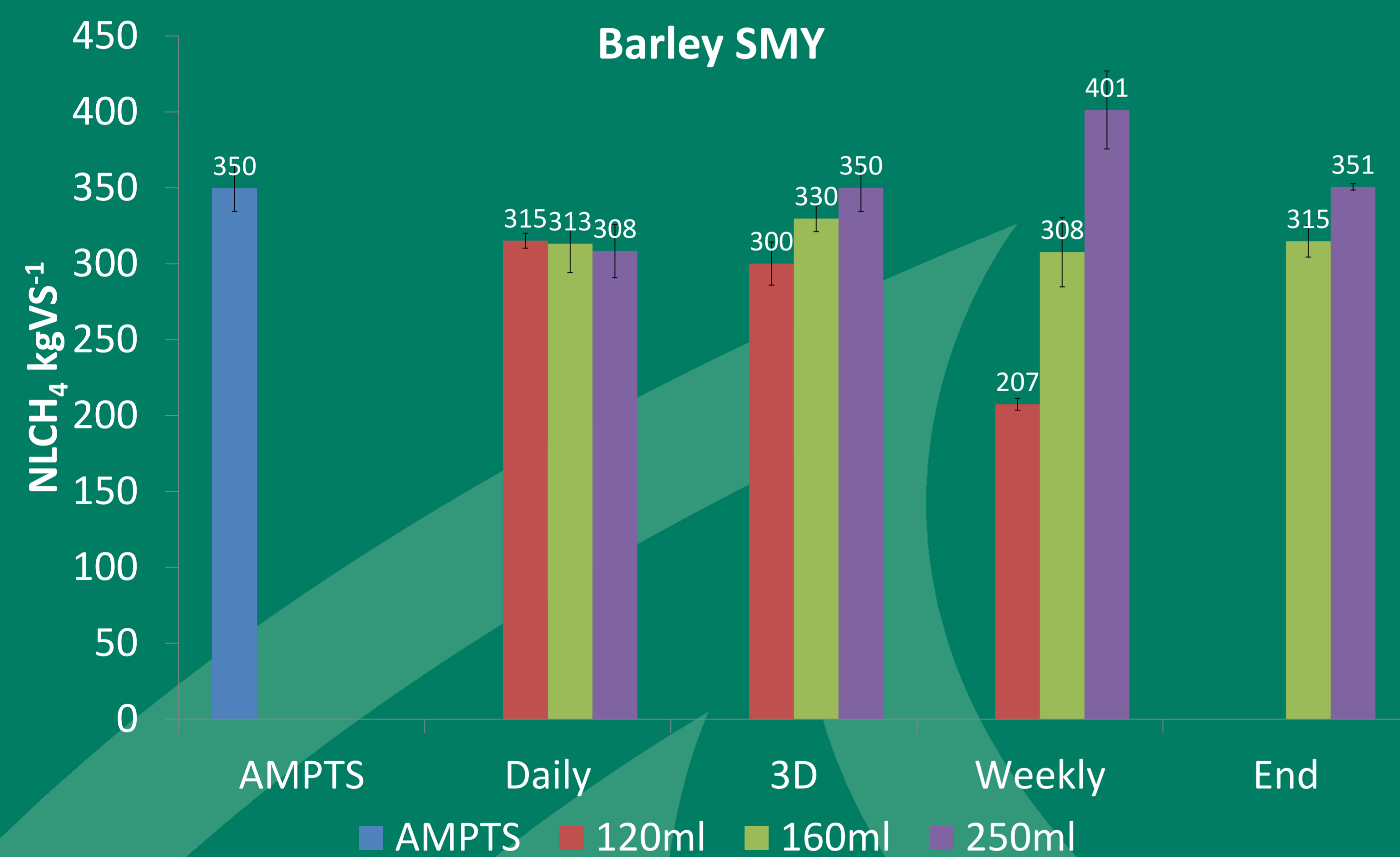
- Reactor bottle volumes Headspace
 - 120 ml bottle 50 ml
 - 160 ml bottle 90 ml
 - 250 ml bottle 180 ml
- Sampling frequency
 - Daily
 - Every 3rd day
 - Weekly
 - Only at the end – 35th Day
- Substrates
 - Dried milled barley grains
 - Dried milled grass silage
 - Cattle slurry
 - Cellulose
- Comparison with AMPTS II®



Objective

- Impact of three different headspace volume and OHP measurement over four different time intervals on specific methane yield (SMY) were studied

Results



Conclusion

- The impact on SMY increases with increase time duration of OHP measurement.
- 250 ml reactor bottles (70 ml total medium with 180 ml) can be used to determine SMY with a single measurement (at the end of BMP)
- Reactor bottle size does not have an impact on SMY when OHP measurement is done on a daily basis

Acknowledgements

This work was completed as part of the ATBEST (Advanced Technologies for Biogas Efficiency, Sustainability and Transport) Marie-Curie Initial Training Network. The network has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement n. 316838. ATBEST is coordinated by the QUESTOR Centre at Queen's University Belfast www.atbest.eu.