



Experiences with the pH-sensors eCow and Smaxtec

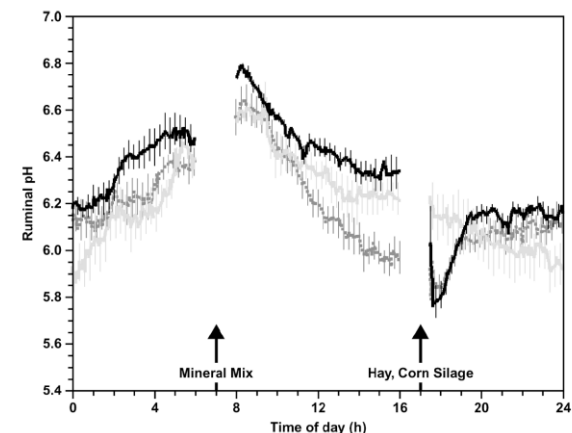
F. Schori and A. Mürger

EGF Working Group Grazing, Trondheim, 4.09.2016



Introduction

- Subacute rumen acidosis widespread nutritional disorder (Duffield et al., 2014)
- Occurs also under grazing conditions (O'Grady et al., 2008)
- Associated with decreased DMI, milk production and BCS, rumenitis and inflammation, laminitis, immunosuppressive disorders etc. (summarised by Gasteiner and Guggenberger, 2013)
- Point measurement (rumenocentesis, stomach (rumen) tube)
- Continuous measurement

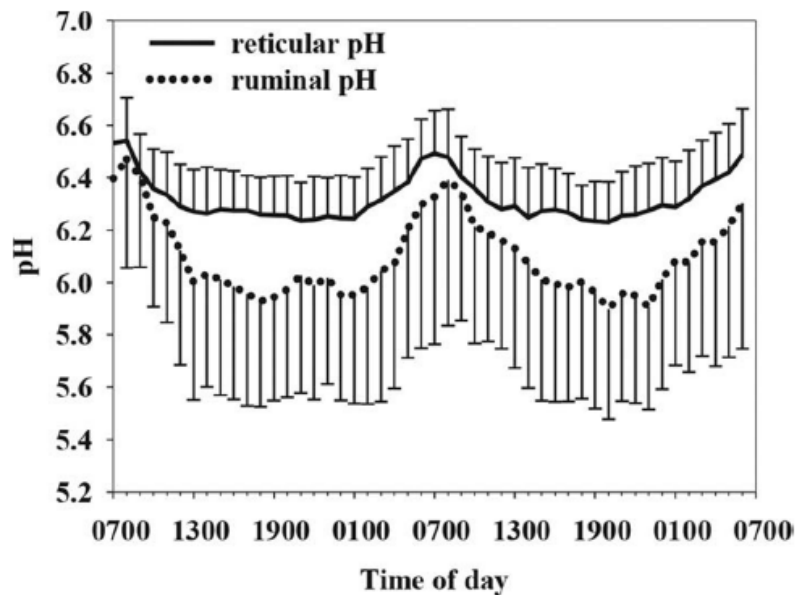




Different pH in the forestomach

Falk et al., 2016

- LRCpH (Lethbridge Research Centre ruminal pH measurement system)
- eCow-bolus





eCow

(eBolus)

Technical specification

- Length: 135 mm
- Diameter: 27 mm
- Weight: 150 g
- Specific Gravity: 2.7
- Temperature accuracy: $\pm 0.1^\circ\text{C}$
- pH accuracy: $\pm 0.1\text{ pH}$
- Sampling rate: 96 data points per day (every 15 min)
- Data storage: 2700 lines (4 weeks)
- 6 months of logging and a 2 year shelf life
- Frequency: 434 MHz



<http://www.ecow.co.uk/bolus-specification/> (25.8.2016)

Smaxtec

(Smaxtec pH & Temp Sensor)

▼ TECHNICAL DETAILS

- Dimensions: 132 x 35 mm (length x diameter)
- Internal antenna
- Internal Li-Ion battery
- Measurement interval: 10 min
- Measurement range (pH): pH 3 - 9
- Measurement range (temperature): $0^\circ\text{C} - 80^\circ\text{C}/32 - 176^\circ\text{F}$
- Measurement accuracy (pH): up to day 90 pH ± 0.2 up to day 150 pH ± 0.4
- Relative measurement accuracy (temperature at $39^\circ\text{C}/102.2^\circ\text{F}$): $\pm 0.05^\circ\text{C}/\pm 0.09^\circ\text{F}$
- Measurement resolution (pH): pH 0.01
- Measurement resolution (temperature): $0.01^\circ\text{C}/0.018^\circ\text{F}$
- Measurement duration pH measurement: 150 days (5 months)
- Battery life temperature measurement: up to 4 years
- Shelf life from date of manufacture: 18 months
- Guarantee: 50 days
- Internal measurement value memory: 50 days

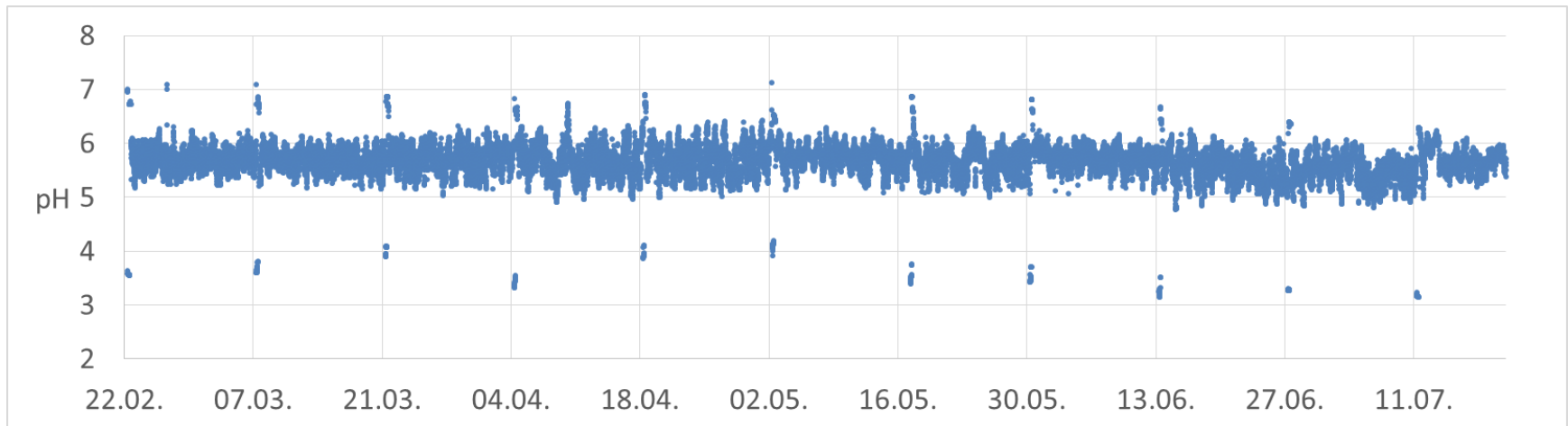


<http://www.smaxtec-animalcare.com/en/products-services/smaxtec-ph-temp-sensor/> (25.8.2016)



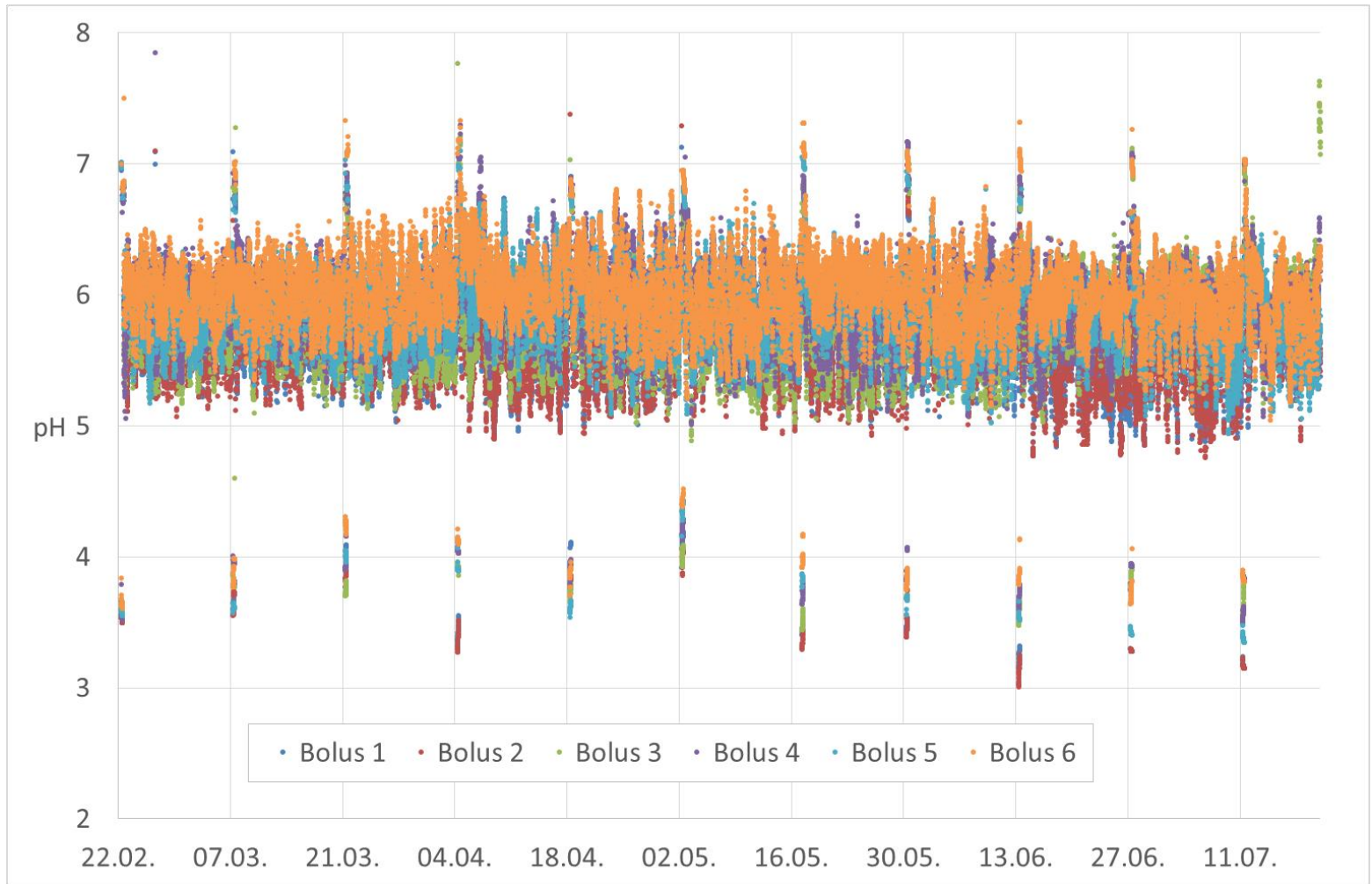
Validation experiment

- 3 rumen cannulated dairy cows
- each cow 4 boluses (2 eCow and 2 Smaxtec)
- started 22.2.2016 and ended 25.7.2016
- every 14 d for 3 h in buffer solutions (pH 4 and 7)



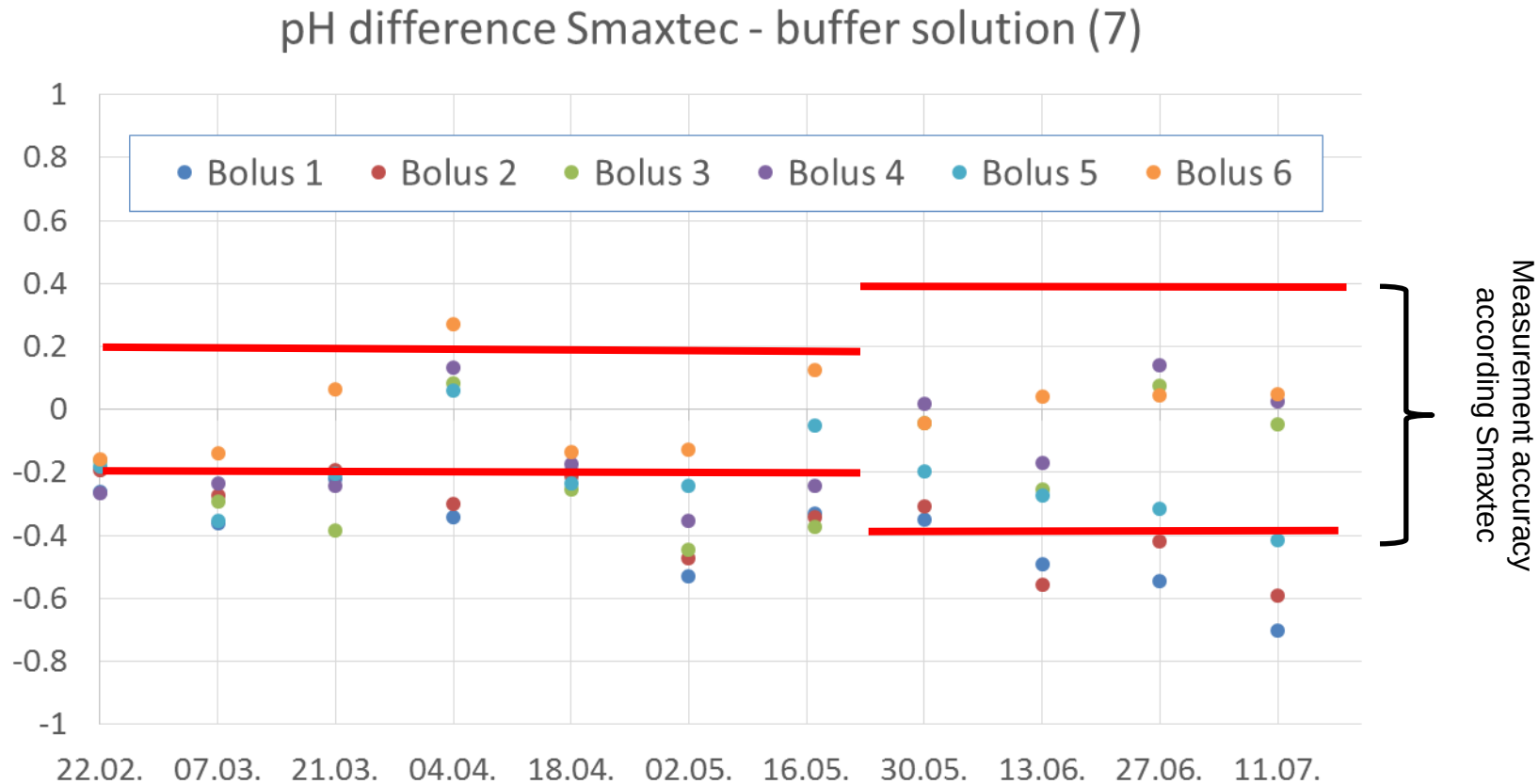


Smaxtec boluses measurements



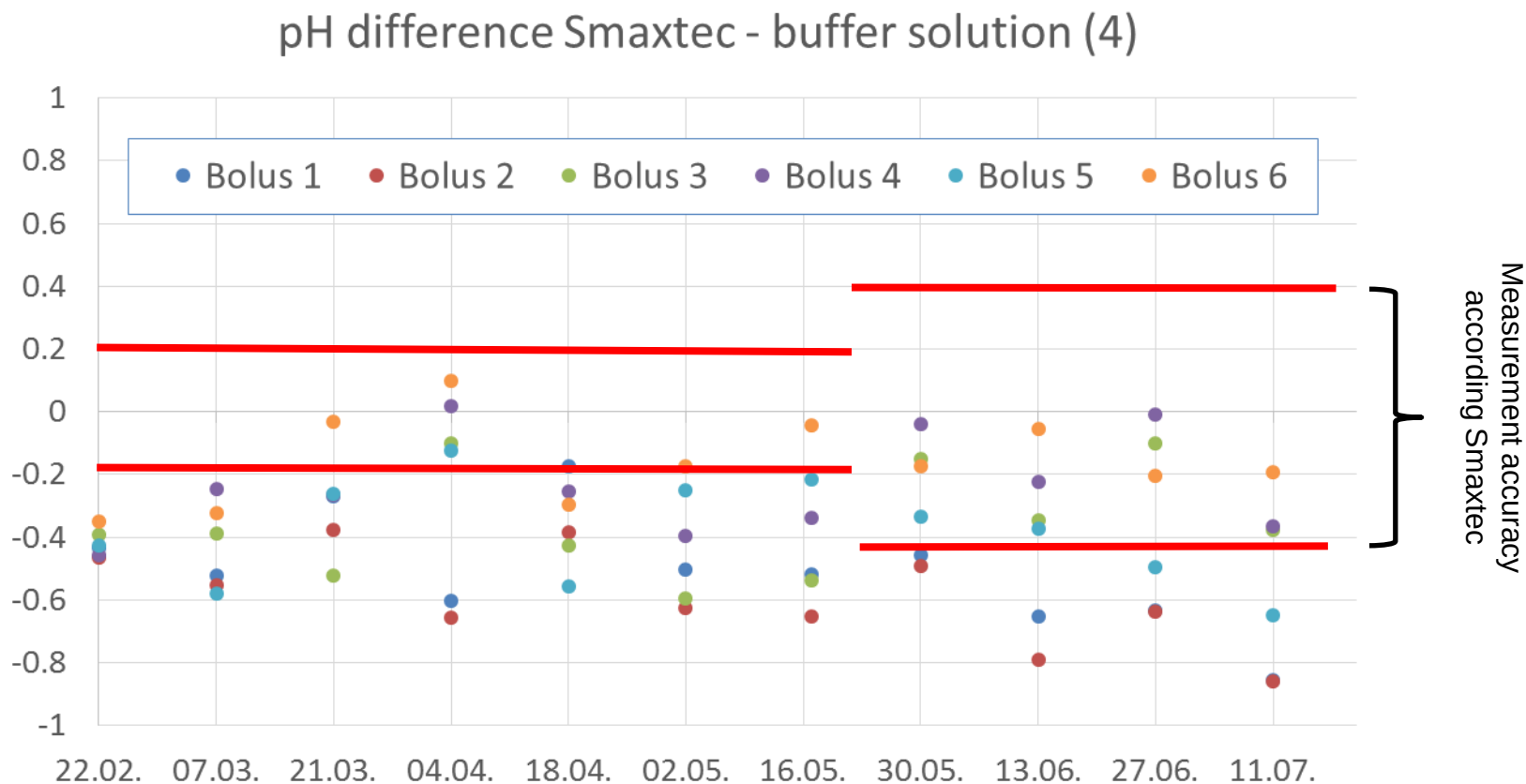


Difference with buffer solution 7



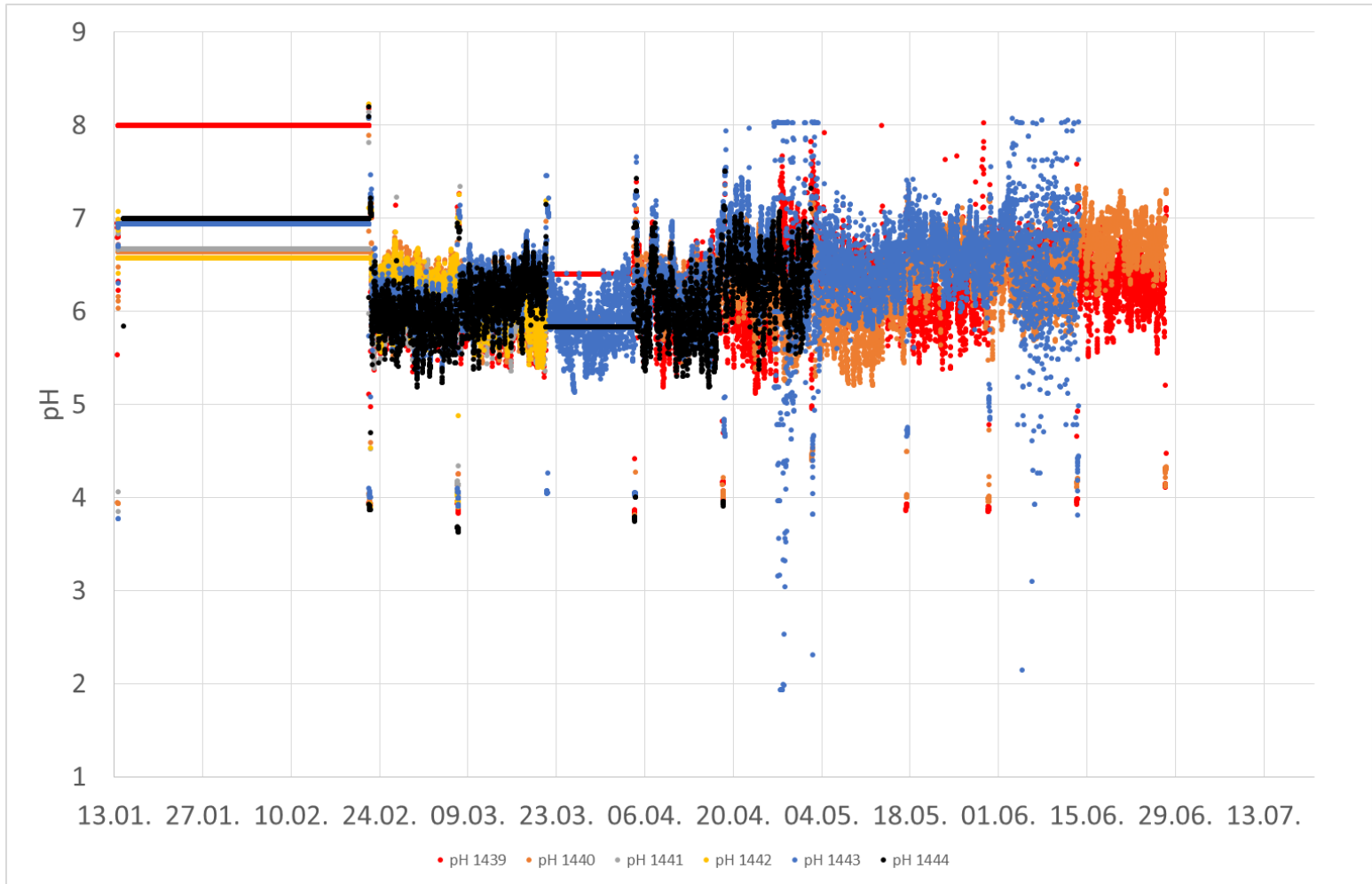


Difference with buffer solution 4





eCow boluses measurements





Thanks for your attention!

Questions?

“ *Our trials have used eCow boluses for some time now and we've been impressed by their longevity, stability and data quality. We have had repeated orders with eCow and will continue to do so.* ”

(<http://www.ecow.co.uk/>)

“The results of the study were excellent, with bolus life-span well exceeding expectations. Traces appear to have a high degree of precision and are very plausible.”

(http://www.smaxtec-animalcare.com/fileadmin/user_upload/documents/Testimonials/)



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