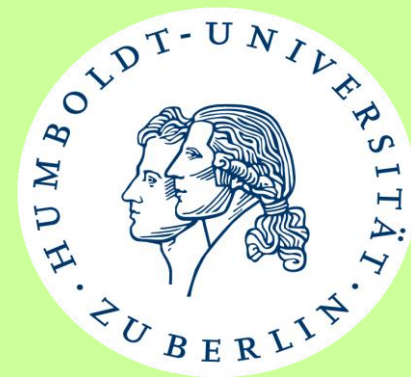




Landwirtschafts-
kammer
Schleswig-Holstein



The XVII International Silage Conference
1-3 July 2015 - Piracicaba - Brazil



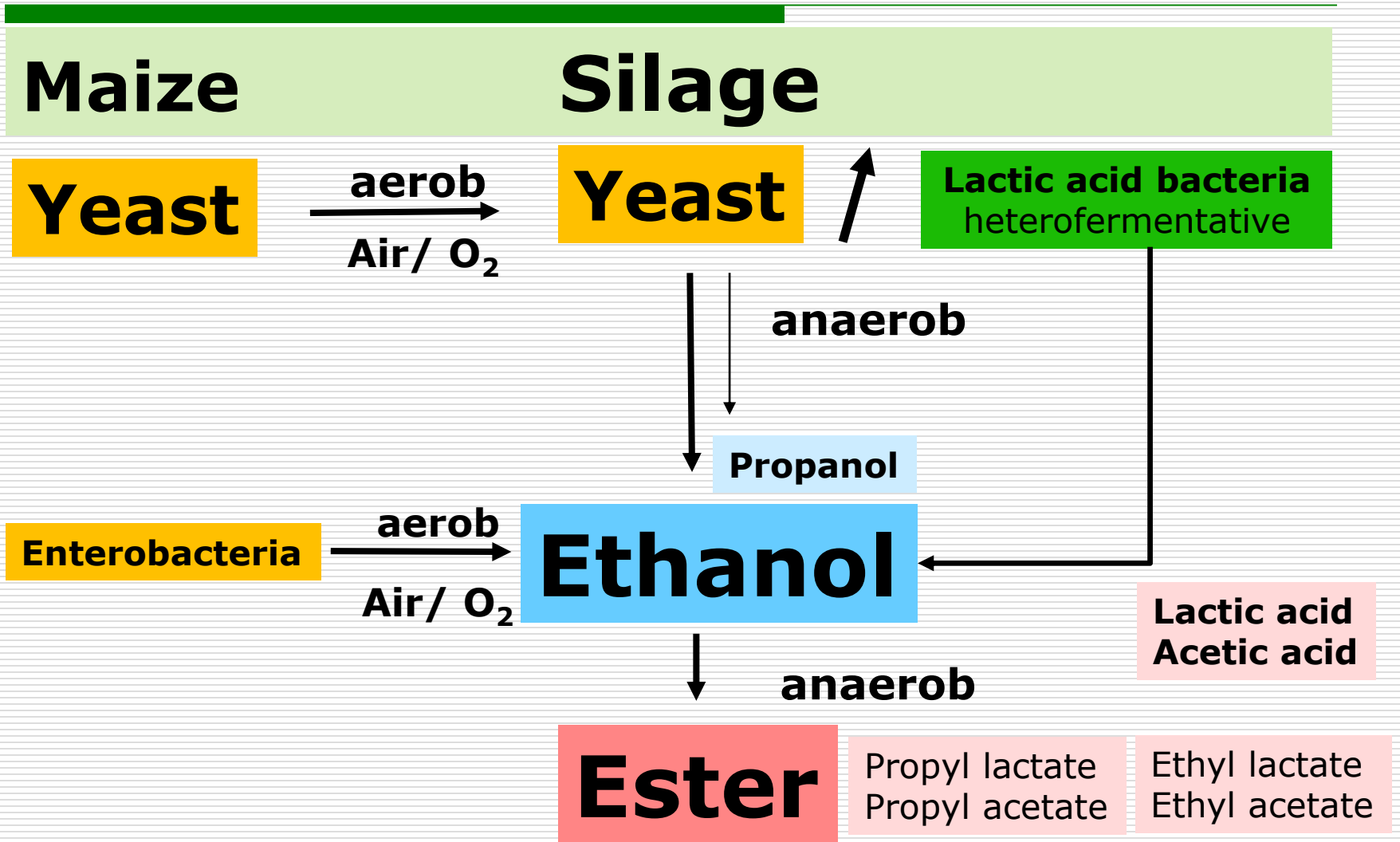
Volatile organic compounds (VOC) in maize silages at German dairy farms

Kirsten Weiß¹, Caroline Olbrich¹, Johannes Thaysen²

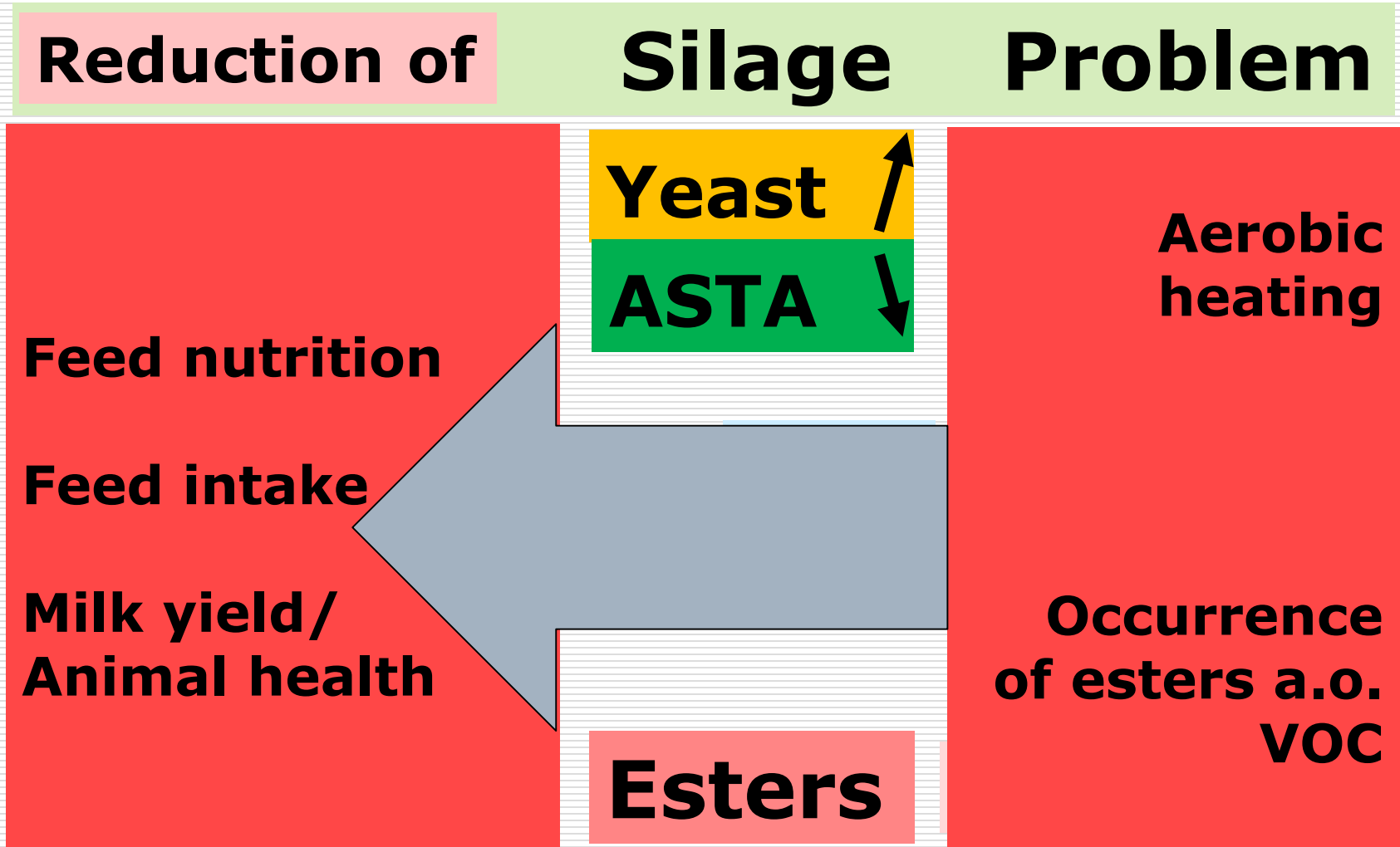
¹Humboldt Universität zu Berlin

²Chamber of Agriculture Schleswig-Holstein, Rendsburg

Introduction



Introduction



Aim of study

- To investigate the incidence of VOC in
 - maize silages
 - German dairy farms

- To monitor the concentrations of
 - ethanol
 - n-propanol
 - esters ethyl and propyl acetate, ethyl lactate

- depending on
 - sampling site on silo face
 - the density of silages

Material and methods

52 Maize bunker silos:

Sample taking

Measurement of **density**

43 Silos without silage additives,
9 Silos with biological additives

Investigations of
155 silage samples:

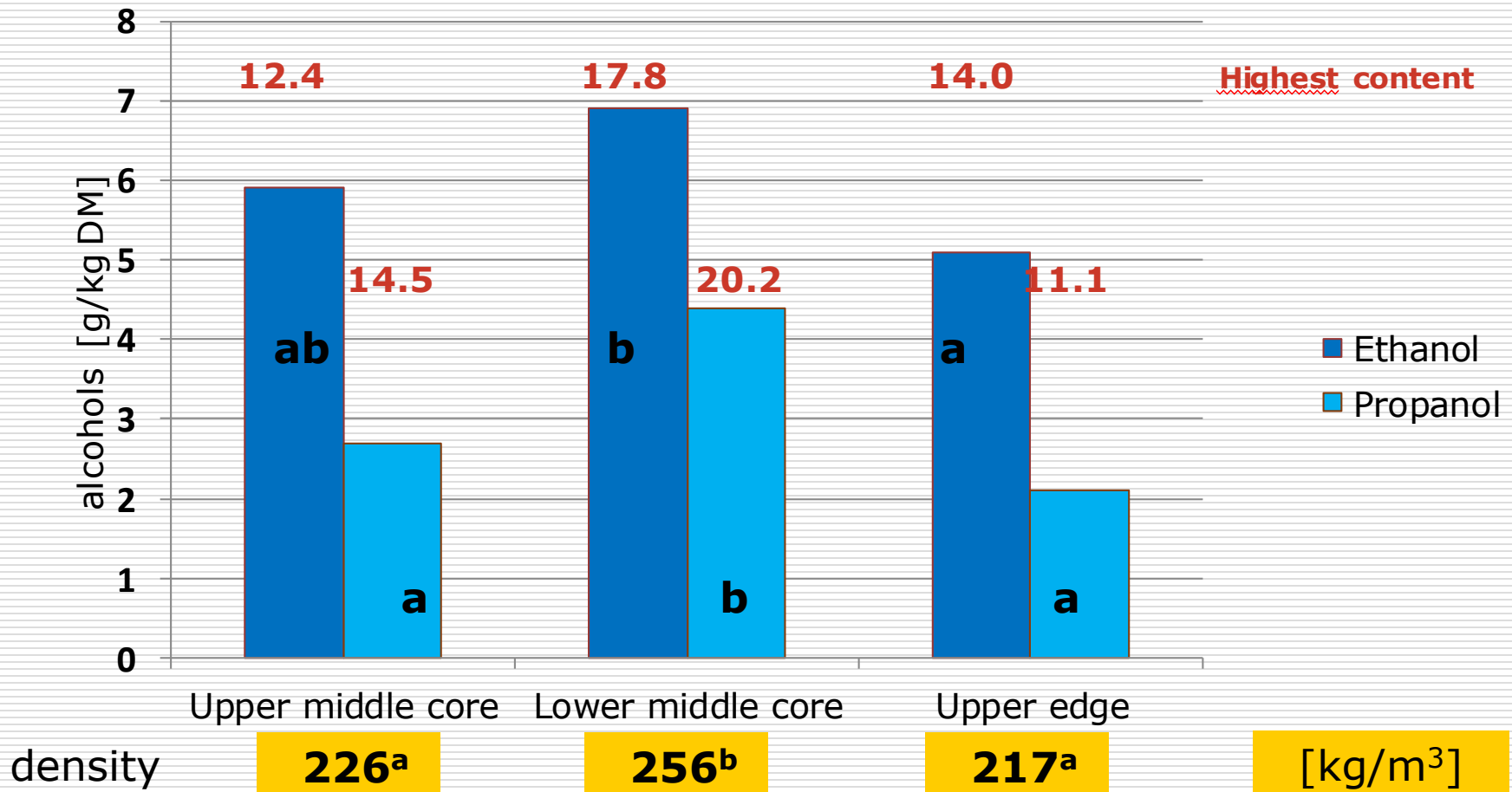
DM, feed value
pH, fermentation acids
alcohols, VOC (Ester)
ASTA and temperature
yeasts, moulds
nitrate and clostridia



Picture: J.Thaysen

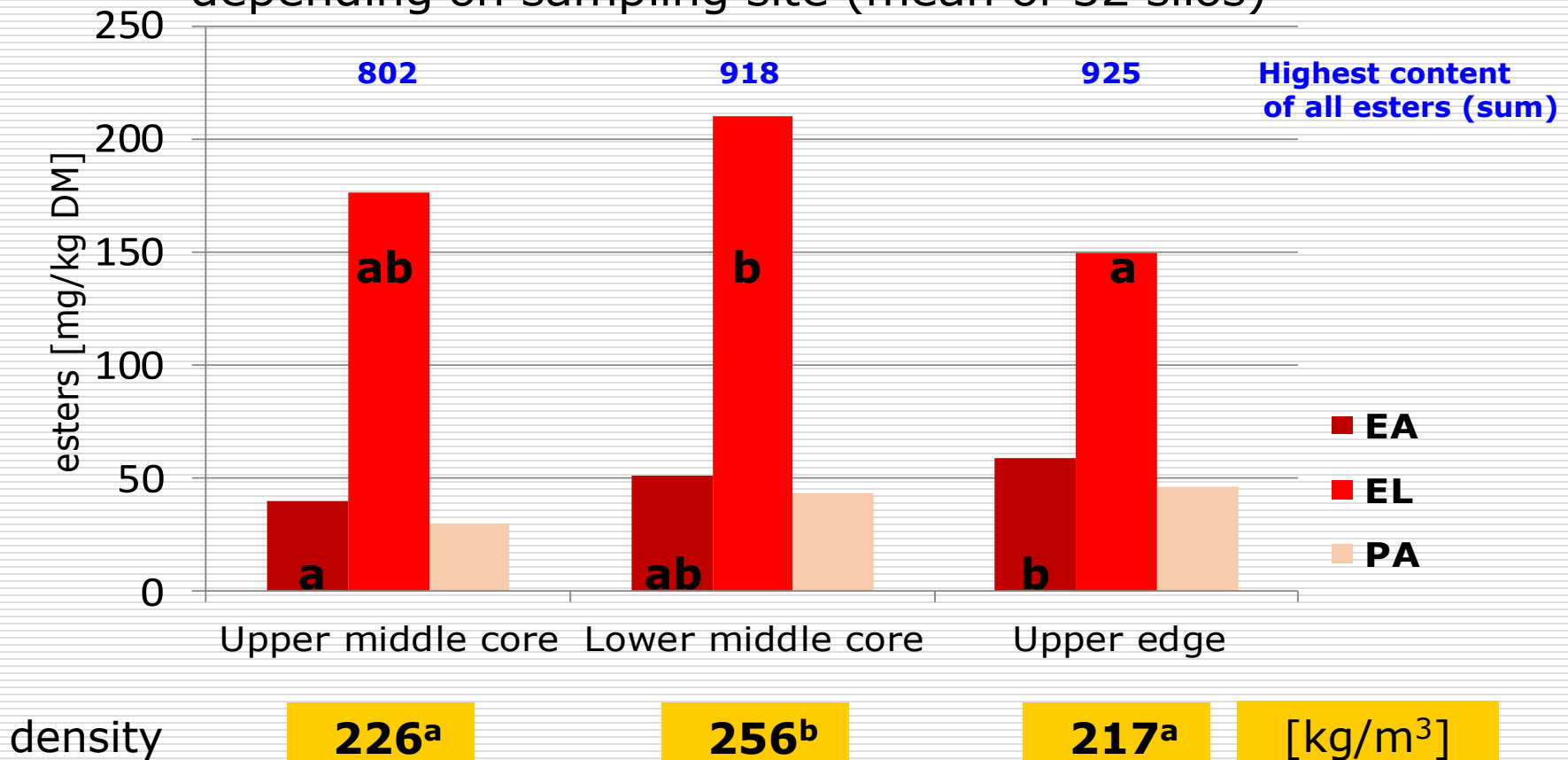
Results – alcohols and compaction

Content of ethanol, propanol and density depending on sampling site (mean of 52 silos)

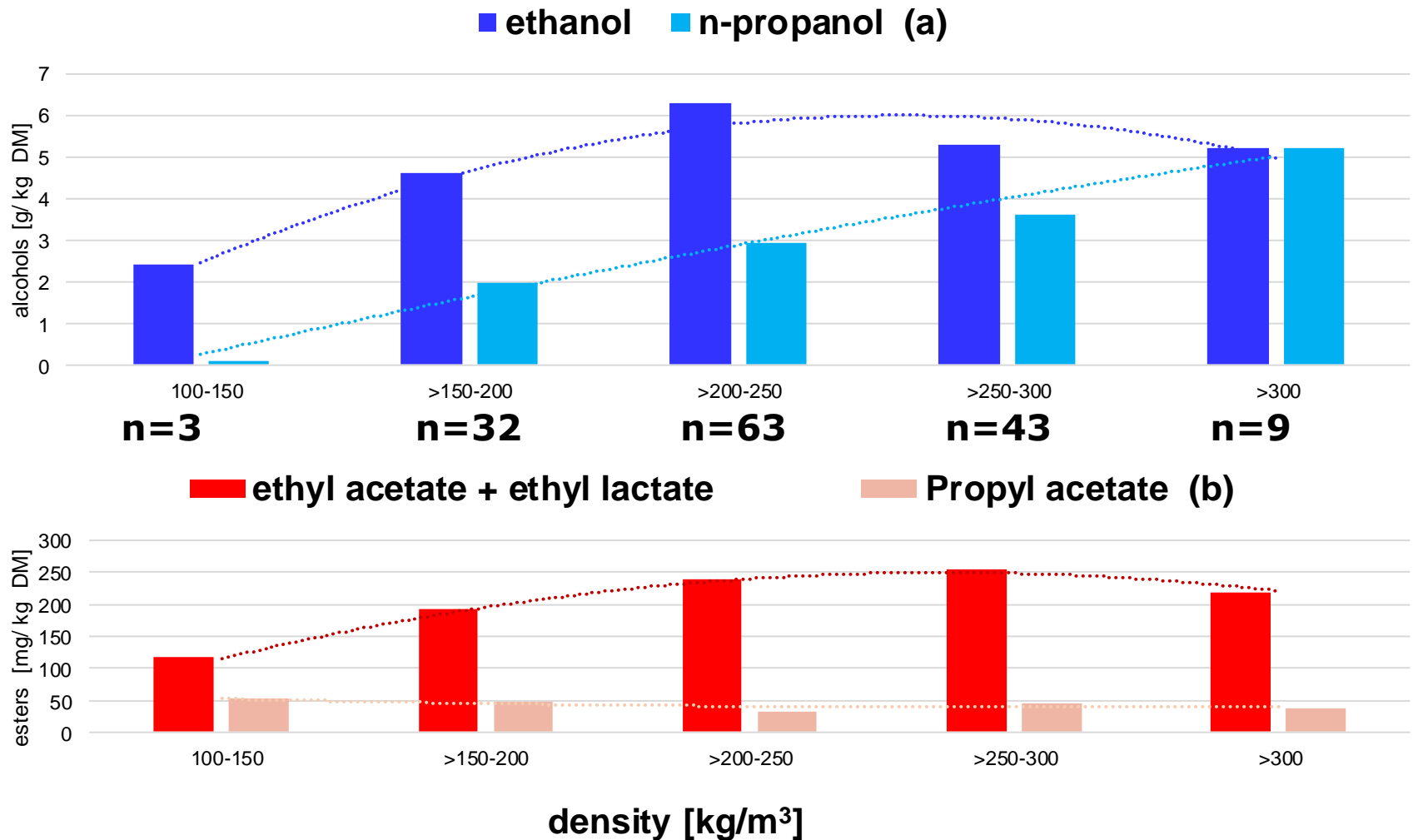


Results – esters and compaction

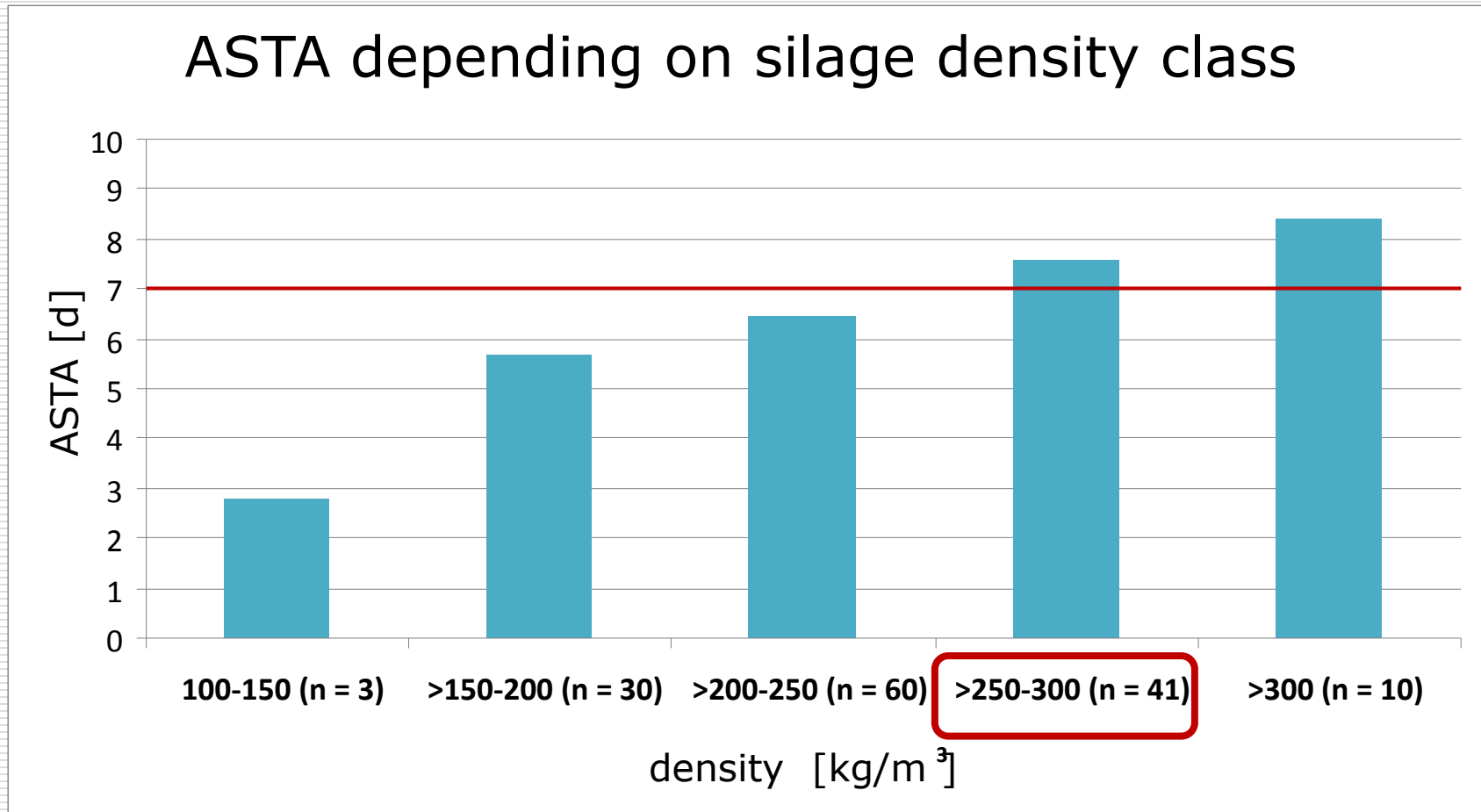
Content of esters ethyl acetate (EA), ethyl lactate (EL), propyl acetate (PA) and density depending on sampling site (mean of 52 silos)



Results – VOC and compaction

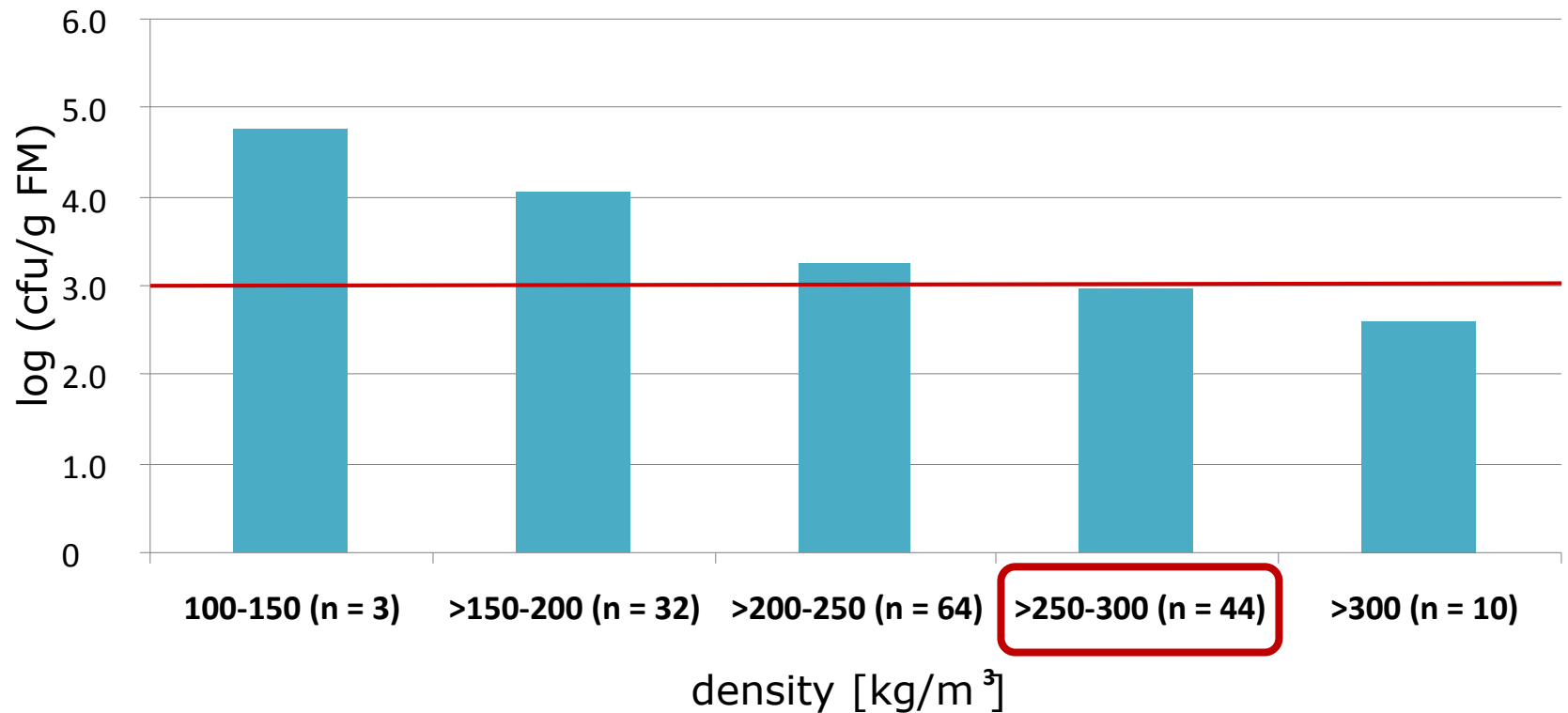


Results- ASTA and compaction



Results- yeasts and compaction

Contents of yeast depending on silage density class



Conclusion

- insufficient compaction is linked to higher counts of yeast and reduced aerobic stability
- high compaction in combination with prompt sealing are important for inhibition of yeast activity
- yeasts are able to survive under anaerobic conditions and to produce especially ethanol which is correlated with ester formation
- yeasts should be inhibited by using chemical silage additives containing benzoate/sorbate and formic/propionic acids (see posters)

Summary

- The results demonstrate the frequent occurrence of VOC in maize silages on dairy farms.
- Sampling site affects the concentrations of alcohols, acids and esters.
- Elevated levels of VOCs, especially alcohols and esters, occur in well-compacted silages stored in bunker silos.

Many thanks to

Johannes Thaysen and Liesel Schnibbe

*Colleagues of Central Lab of Analytics
at the Humboldt Universität zu Berlin*

Addcon Europe GmbH for financial support

Thank you for the attention