



EFFECT OF CP LEVELS FOR FINISHERS

JAN VÆRUM NØRGAARD
DEPT. OF ANIMAL SCIENCE
AARHUS UNIVERSITY, FOULUM
JAN.NOERGAARD@AGRSCI.DK

Abstract #18898: Nitrogen utilisation and carcass composition in finisher pigs fed different content of crude protein. EAAP Annual Meeting 2014, Copenhagen, Denmark
Session 45 "Free communications animal nutrition"
28 August 2014



BACKGROUND

- › Dietary protein for finisher pigs (30-110 kg)
 - › Most important factor in reducing nitrogen excretion
 - › Crude protein (CP) content in finisher diets is high(er) in Denmark
 - › Meat % is a major component for the carcass value
 - › It is debated whether low-protein diets reduce meat %



HYPOTHESES

- › Reduced crude protein
 - › No effect on gain, feed intake, and carcass - if amino acid requirements are covered
 - › N excretion and emission will decrease linearly

- › Higher crude protein than required
 - › Increases meat % because of amino acid catabolism and low fat deposition – not because of increased protein synthesis as such
 - › N excretion and emission will increase



CONCEPTS OF TREATMENTS

> 4 dietary treatments

- > Control (recommended CP level)
- > -8% CP
- > -15% CP (lowest possible)
- > +8% CP (extra crude protein, same dispensable amino acid content)
- > Same SID lysine in all diets
- > Minimum recommendations for non-dispensable amino acids fulfilled

	Control	-8%	-15%	+8%
	Treat. 159	Treat. 148	Treat. 136	Treat. 159+DAA
CP, g/kg	159	148	136	168
SID CP, g/kg	134	124	113	144
SID lysine, g/kg	7.4	7.4	7.4	7.4



PROTOCOL

- › Emission barn and metabolism cages
 - › Female pigs, 54-99 kg
 - › 4 pens of 16 pigs/treatment
 - › 6 wk housing in emission lab rooms
 - › Wk 1-6: Measurement of emissions
 - › Wk 4: 24 pigs in cages (N balance)
 - › Wk 7: Blood samples and slaughter





MEASUREMENTS

- › Gain + feed intake d 0, 21, 42
- › N balance from d 22-27
- › Urea in blood samples
- › Carcass:
 - › Meat % (AUTOFOM using ultrasonic probes)
 - › Back fat depth
 - › By ruler at last rib + last lumbal spine
 - › By ultrasonic probes at 3 sites
- › Ammonia emissions (and more)

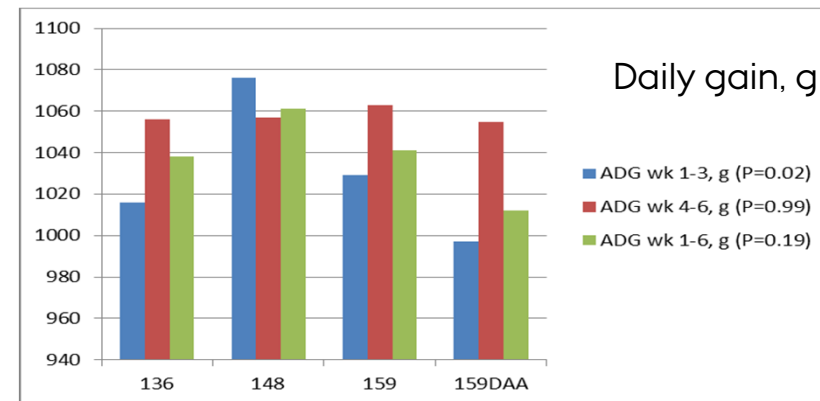
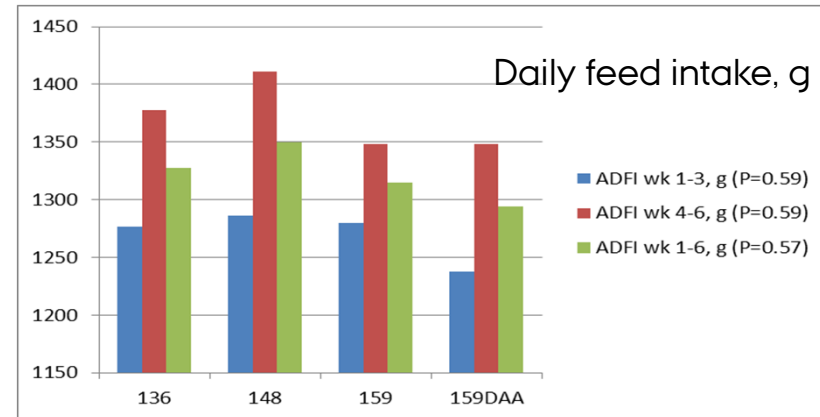




RESULTS

- > Animal performance
 - > Feed intake was not different
 - > Gain was not different

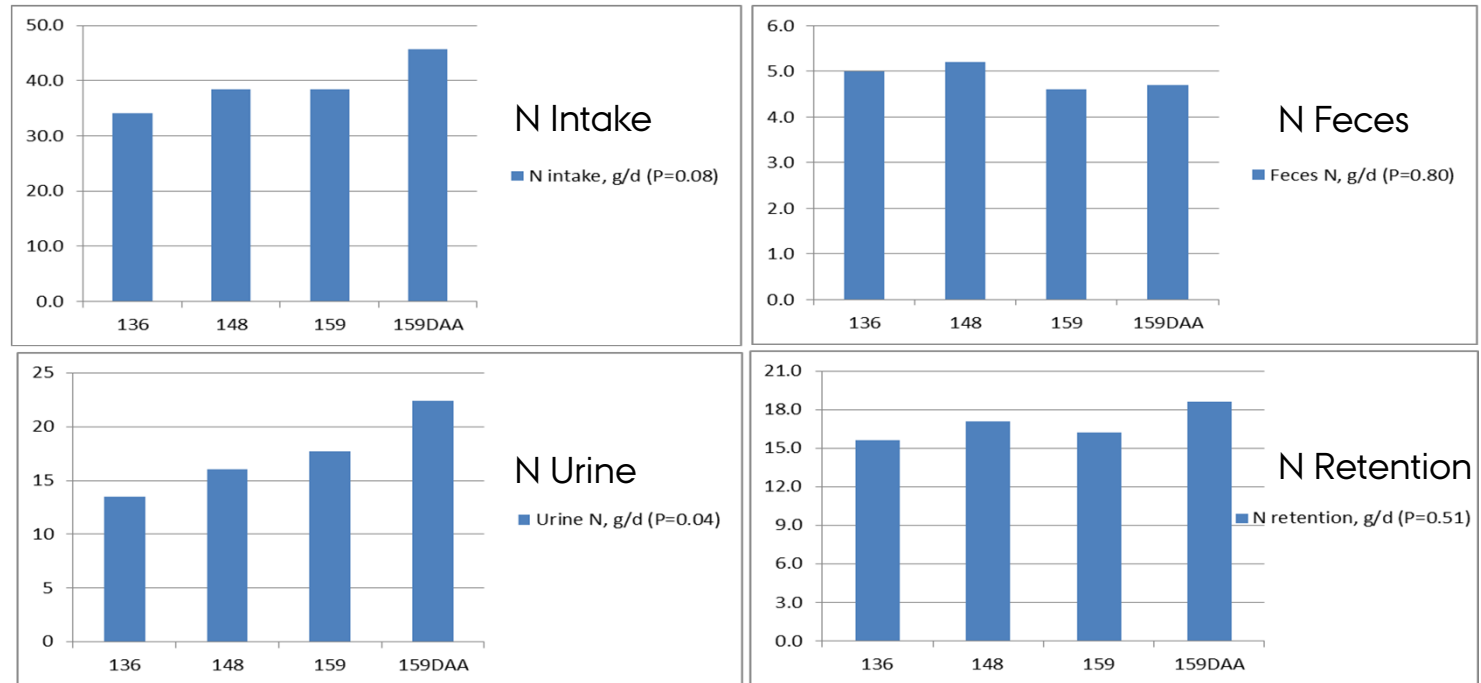
- > Although few repetitions to study production parameters, results do not indicate negative consequences of reducing from 159 g CP/kg





RESULTS

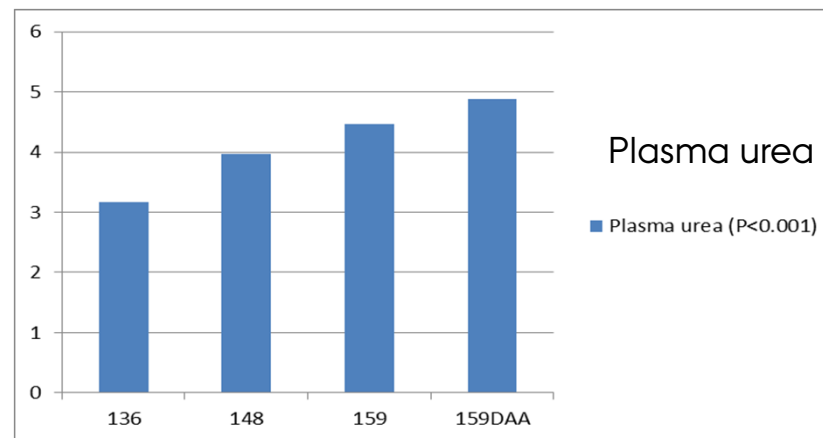
- › N-balance
- › Retention not different
- › N in urine showed clear pattern





RESULTS

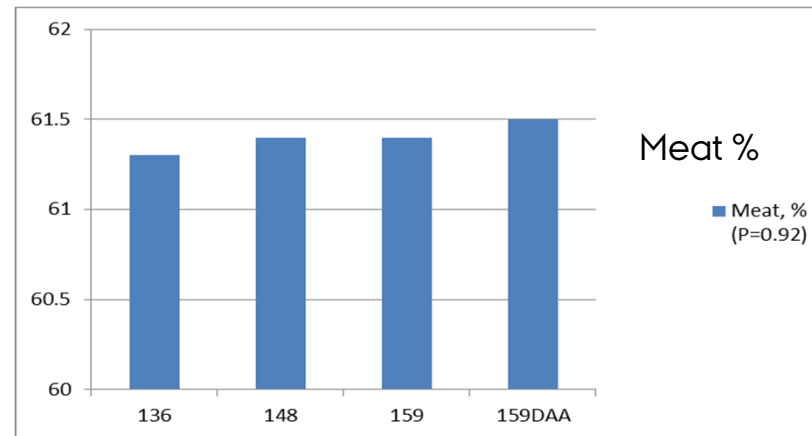
> Plasma urea indicated better protein utilization at low CP levels





RESULTS

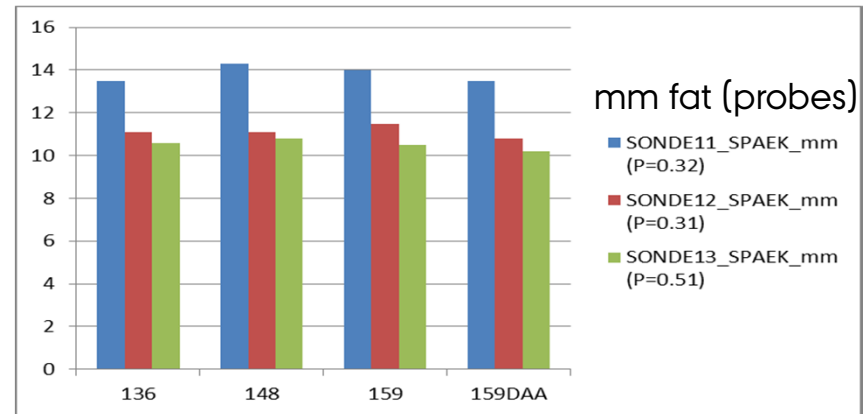
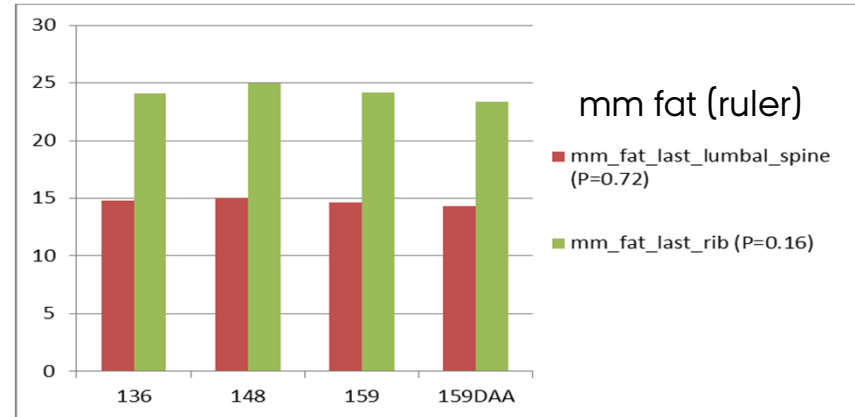
> Meat % was not different





RESULTS

- › Back fat depth of carcass
 - › No difference measured by ruler at last lumbal spine or last rib
 - › No difference measured by 3 ultrasonic probes

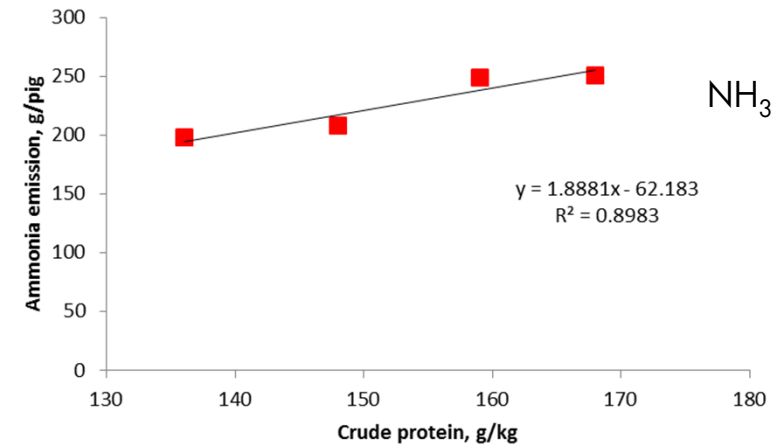
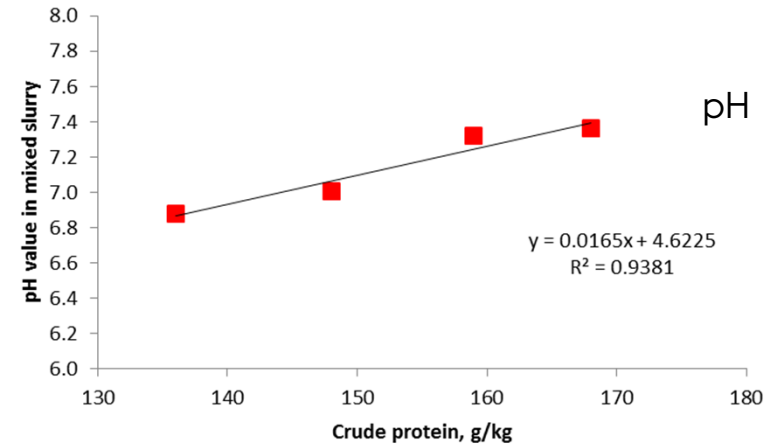




EMISSION STUDY

- > Slurry pH decreased, and
- > NH₃ emission reduced by 21% going from 159 to 136 g CP/kg
- > -9% NH₃ emission/10 g reduction in dietary CP

- > Michael Jørgen Hansen et al., Dept. of Engineering, Aarhus University. Paper submitted to Livest. Sci.





CONCLUSIONS

- › Dietary CP can be reduced from 159 to 136 g CP/kg diet without impaired animal performance and carcass characteristics
- › N excretion was reduced by 7-10% when reducing CP 10 g/kg
- › Supplementation of dispensable amino acids (+13.6 g/kg) resulted in higher plasma urea concentrations and greater N excretion, but did not affect carcass composition significantly
- › Ammonia emission was reduced linearly by 9% per 10 g CP/kg



› Thank you!

- › Jan Værum Nørgaard
- › Dept. of Animal Science
- › Aarhus University, Foulum
- › Jan.noergaard@agrsci.dk

- › Abstract #18898: Nitrogen utilisation and carcass composition in finisher pigs fed different content of crude protein
- › Paper just accepted for publication in Acta Agri. Scand., Section A - Anim. Sci. DOI: 10.1080/09064702.2014.943280