The effect of dietary valine-to-lysine ratio on sow performance and piglet growth during lactation

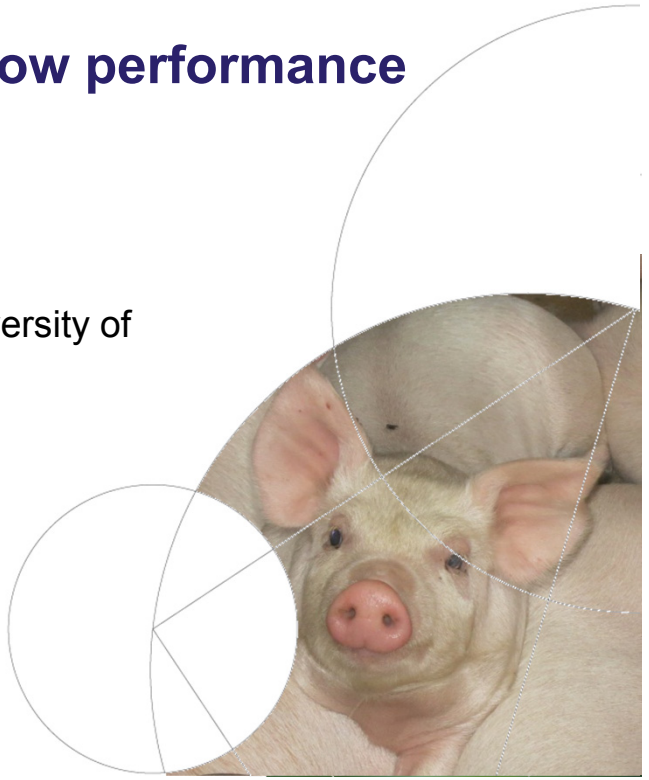
A.V. Starthe[1], T.S. Bruun[2], C.F. Hansen[1]

[1]Department of Large Animal Science, Faculty of Health Sciences, University of Copenhagen

[2]Danish Pig Research Centre, Danish Agriculture & Food Council

Anja Varmløse Strathe, Ph.D.-student

avha@sund.ku.dk



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Background

- The right ratio between lysine and other essential amino acids -> optimal utilization of dietary protein

- Results from literature on valine-to-lysine ratio for lactating sows:
    - Optimal valine-to-lysine ratio varies between studies.
    - Studies with few sows

- Synthetic valine is now available
    - Easier to change dietary valine-to-lysine ratio without major changes in crude protein content

Hypothesis and objective

- **Hypothesis:** The best valine-to-lysine ratio would
    - Increase litter growth
    - Prevent excessive body mobilization

- **Objective:** To test the effect of six dietary valine-to-lysine ratios for lactating sows on sow performance and litter growth.

Material and methods

Overall projec
- Conducted
- 480 Danish
- Experimen

Extra measu
- 72 second

This presentation:
- Sow weight
- Sow back fat
- Litter gain
- Blood samples

Measurements:
- Sow weight
- Sow back fat
- Litter weight

t

- 4 x blood sample sow
- 4 x urine sample sow

Materials and methods

- Sow were allotted to one of six dietary treaments:

	Diet					
	1	2	3	4	5	6
Composition						
Crude protein, %	14.2	14.2	14.2	14.2	14.2	14.2
Standard digestible lysine, g/kg	7.1	7.1	7.1	7.1	7.1	7.1
Standard digestible valine, g/kg	5.4	5.6	5.8	6.1	6.5	6.9
Standard digestible Val:Lys, %	75.8	79.0	82.0	85.0	91.0	97.0
Total Val:Lys, %	**80.1**	**82.9**	**85.5**	**88.1**	**93.3**	**98.5**

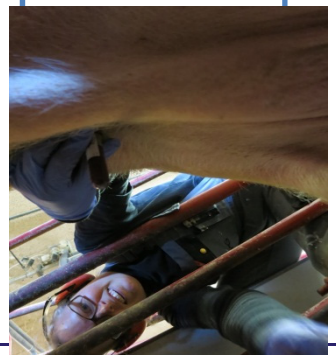
Materials and methods

Day 2

- Standardization of litter to 14 piglets
- Litter weight
- Sow BW and backfat
- Blood sample

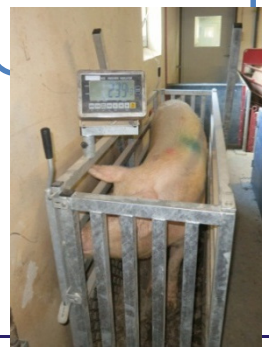
Day 10

- Litter weight
- Blood sample



Day 17

- Litter weight
- Sow BW and backfat
- Blood sample



Day 26

- Weaning
- Litter weight
- Sow BW and backfat
- Blood sample

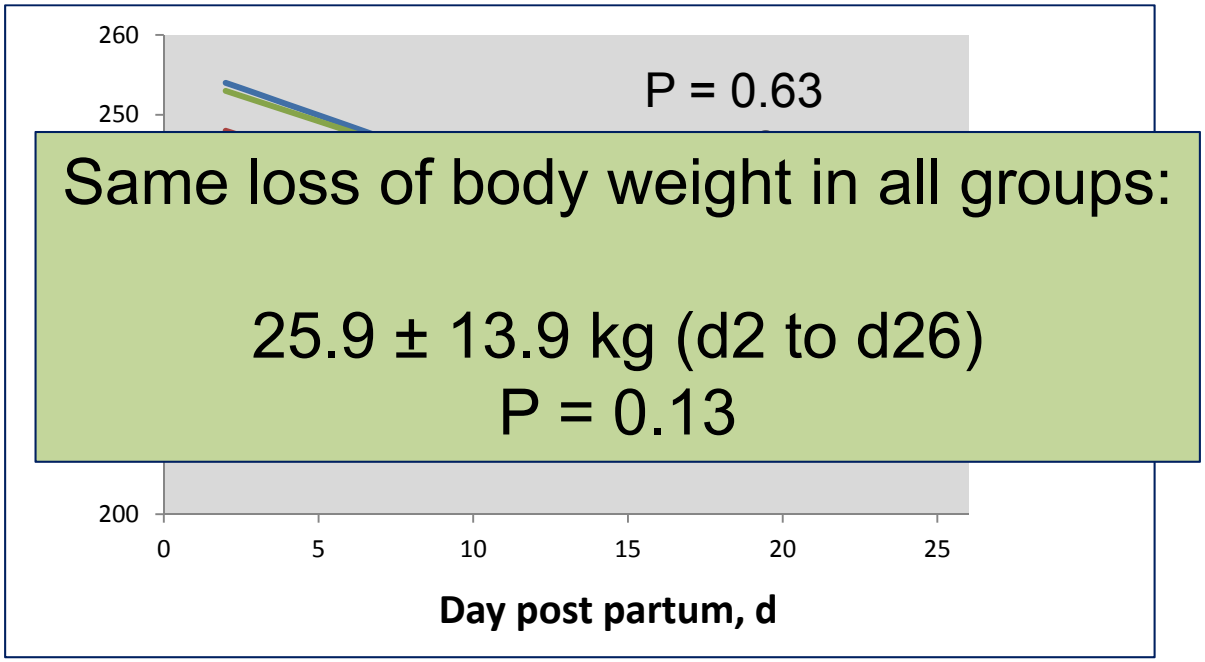
Results – Feed intake

	Diet						SE	P-value
	1	2	3	4	5	6		Diet
Val:Lys, %	**80.1**	**82.9**	**85.5**	**88.1**	**93.3**	**98.5**		
n	12	12	12	11	13	10		
Feed intake, kg/d	6.3	6.1	6.1	6.1	5.9	5.9	0.24	0.66
Valine intake, g/d	41						1.81	0.35

Average intake: 6.1 ± 0.8 kg/d

Average valine intake: 43.2 ± 5.8 g/d

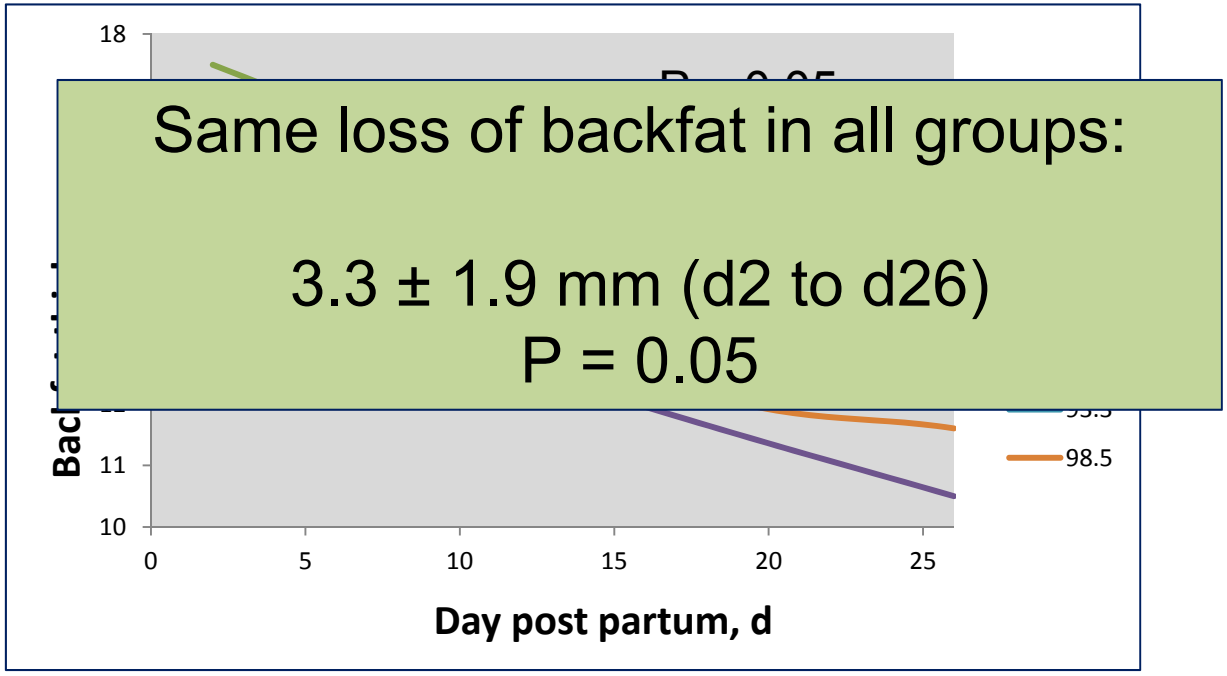
Results – Sow body weight (BW)



Same loss of body weight in all groups:

25.9 ± 13.9 kg (d2 to d26)
P = 0.13

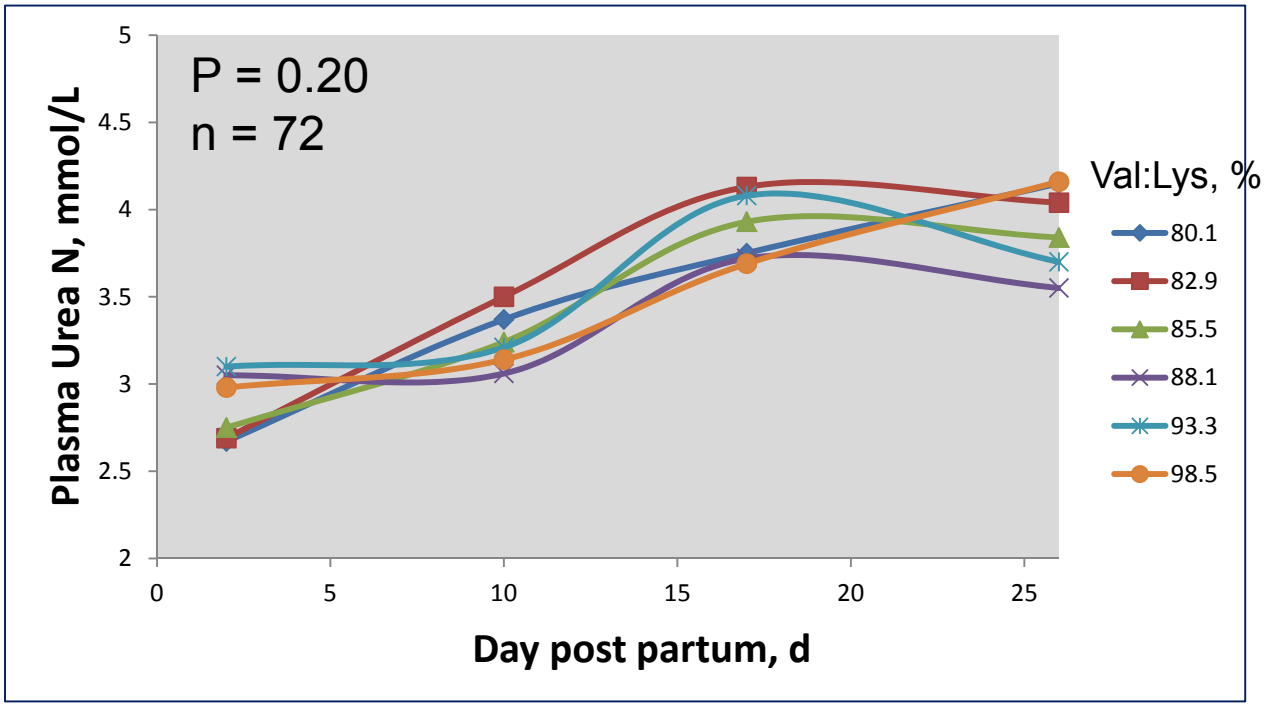
Results – Sow backfat thickness (BF)



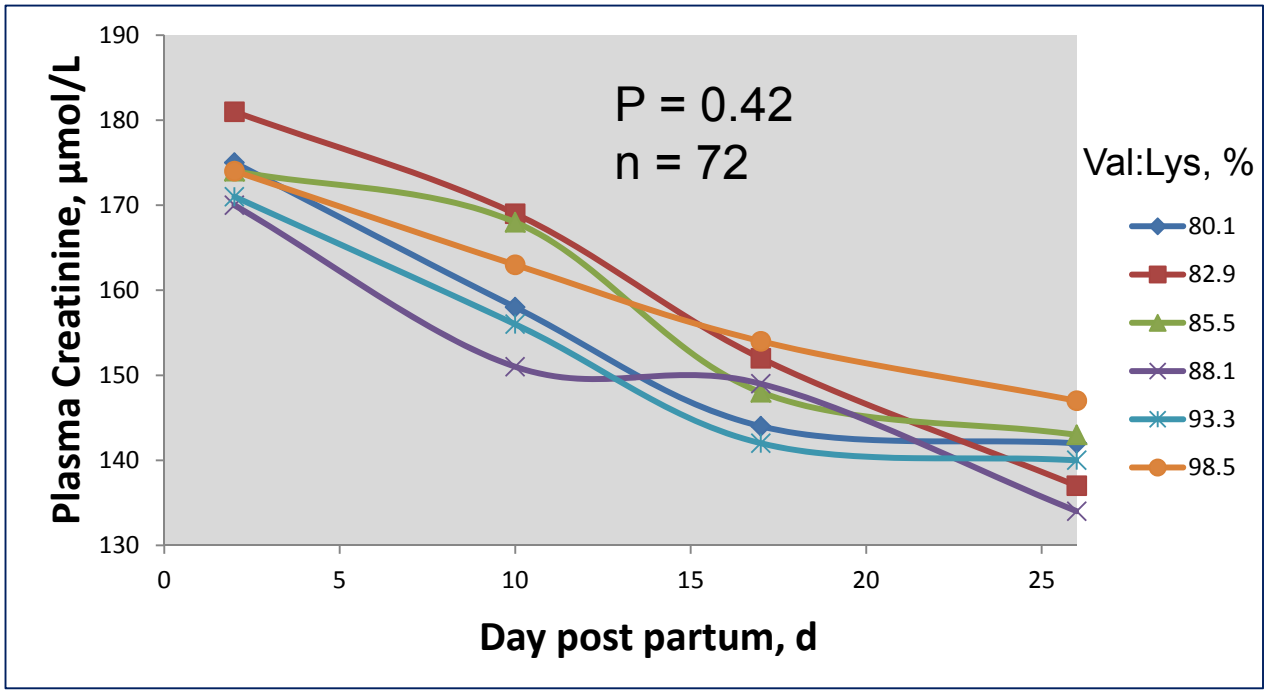
Same loss of backfat in all groups:

3.3 ± 1.9 mm (d2 to d26)
P = 0.05

Results – Plasma urea nitrogen



Results – Plasma Creatinine



Results – Plasma metabolites

- Plasma glucose: No dietary effect (P = 0.33)
- Plasma lactate: No dietary effect (P = 0.37)

- Plasma NEFA: No dietary effect (P = 0.89)
  - Decreased over time in all groups -> Body fat mobilization

Results –Litter performance

	Diet						SE	P-value
	1	2	3	4	5	6		Diet
Val:Lys, %	**80.1**	**82.9**	**85.5**	**88.1**	**93.3**	**98.5**		
n	12	12	12	12	13	11		
Litter size weaning	Average litter size: 12.8 ± 1.2 piglets							0.25
ADG, kg/d	Average ADG: 3.0 ± 0.6 kg/d							0.08

Conclusion

- No effect of increasing Val:Lys on
  - Litter ADG
  - Sow body condition

- No need to increase Val:Lys above 80%

Thank you for your attention!

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