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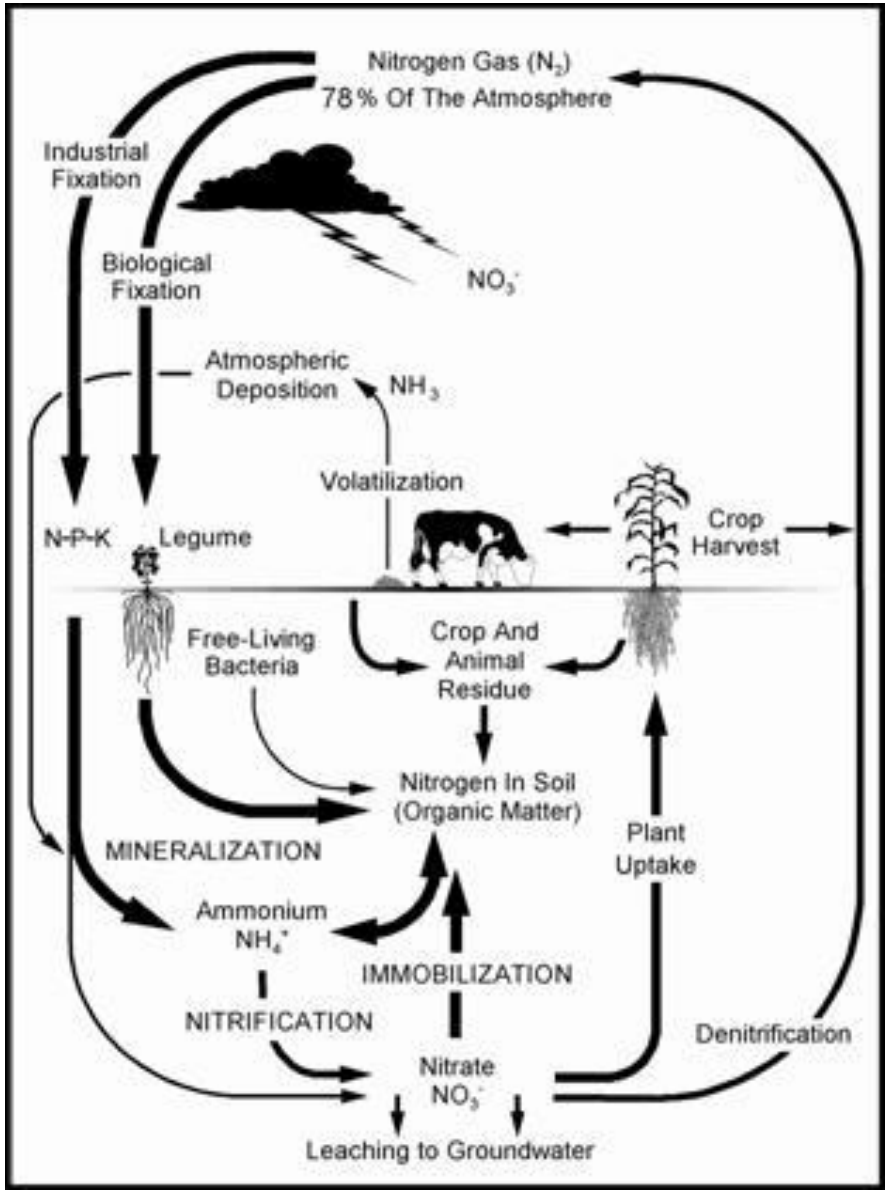
Flanders research institute for agriculture, fisheries and food

The effect of dietary protein levels on reproduction performance and *E. coli* shedding in sows

Kikianne Kroeske, Nadia Everaert, Marc Heyndrickx, Martine Schroyen and Sam Millet

Introduction

- Crude protein diets in late gestation sows
- High Crude Protein (CP) in diets for sows increases urea excretion
  - Nitrogen pressure on the environment
- Protein fermentation in large intestine
- Gut microbiome of the piglets



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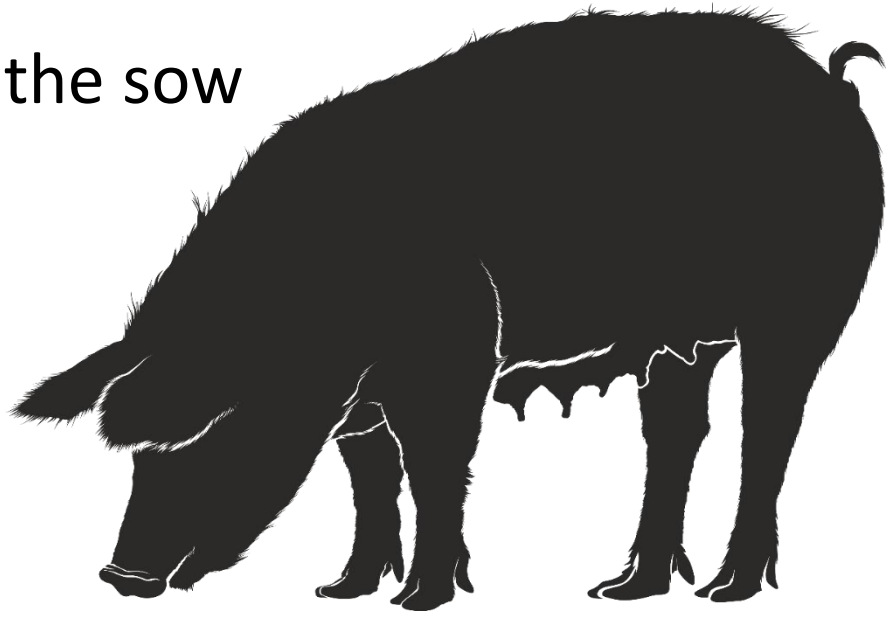
Research objectives

- **Maintain reproduction results** of sows with low dietary CP but sufficient amino acids
- **Maintain same piglet performance** at low protein diet of the sow
  - Without reducing milk production of the sow
- Look at the abundance of ***E. coli*** **in feces** of the sow



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MATERIALS AND METHOD

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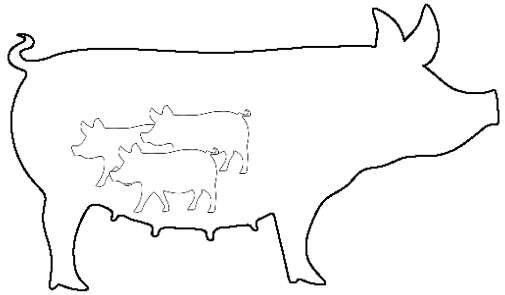
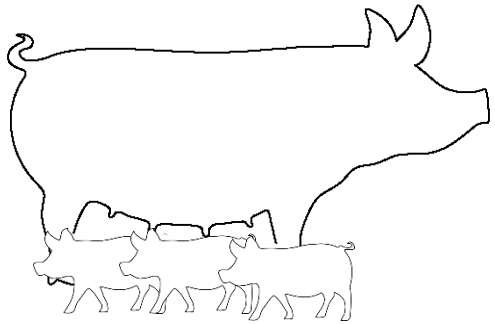
Experimental set-up

= Blood sampling

= Milk sampling

= Start treatment (+feed sampling)





-6 weeks | -1 | 0 | 1 | 2 | 3 | 4 weeks

Late gestation | **Lactation phase**

Weaning

HP: 16.8% CP (n=18)

LP: 12.2% CP (n=17)

Sow:
Lactation feed
18%CP

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RESULTS

Nutrient composition sow feed

	High CP g/kg (analyzed)	Low CP g/kg (analyzed)	Lactation diet g/kg (analyzed)
Dry matter	897	900	899
Crude protein	188	135	180
Crude fat	57	45	56
Crude fiber	72	75	66
NEv (MJ/kg)	9.100	9.100	9.4
Soluble carbs (estimated)	520	575	529
Starch (estimated)	258	330	300

Reproduction results sows

Variables	Measurement (rel. to farrowing)	High protein (n=18) Mean.	High protein (n=18) SE	Low protein (n=17) Mean.	Low protein (n=17) SE	p-value
Bodyweight sows (kg)	6 weeks before	236	9	235	11	0.83
	1 week before	249	11	260	13	0.40
	4 weeks after	220	10	227	11	0.57
Back fat thickness sows (mm)	6 weeks before	15	0.9	15	1.0	0.80
	1 week before	15	1.1	17	1.1	0.35
	4 weeks after	11	1.1	12	0.8	0.45
Feed intake (kg)		185.93	3.68	190.32	3.57	0.40

Reproduction results piglets

Variables	Measurement (rel. to farrowing)	High protein (n=18)		Low protein (n=17)		p-value
		Mean.	SE	Mean.	SE	
Litter size (#)		16.4	0.80	17.0	0.70	0.65
Birthweight (born alive) (kg)		1.32	0.02	1.41	0.02	0.21
Weaning weight (kg)		7.33	0.11	7.16	0.16	0.52
Weaned piglets per sow (#)		12.6	0.70	12.1	0.60	0.83

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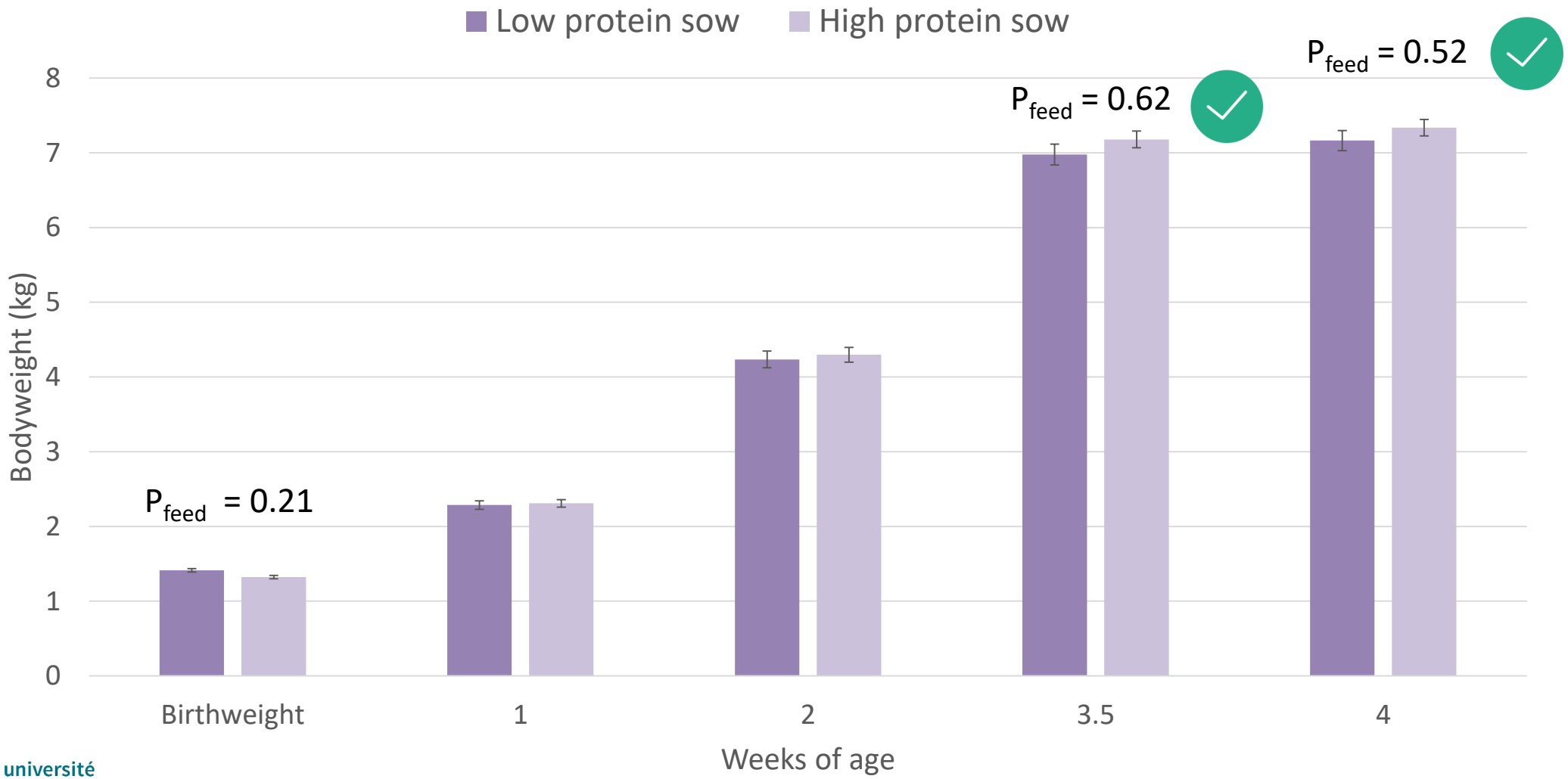
Bodyweight piglets during lactation period



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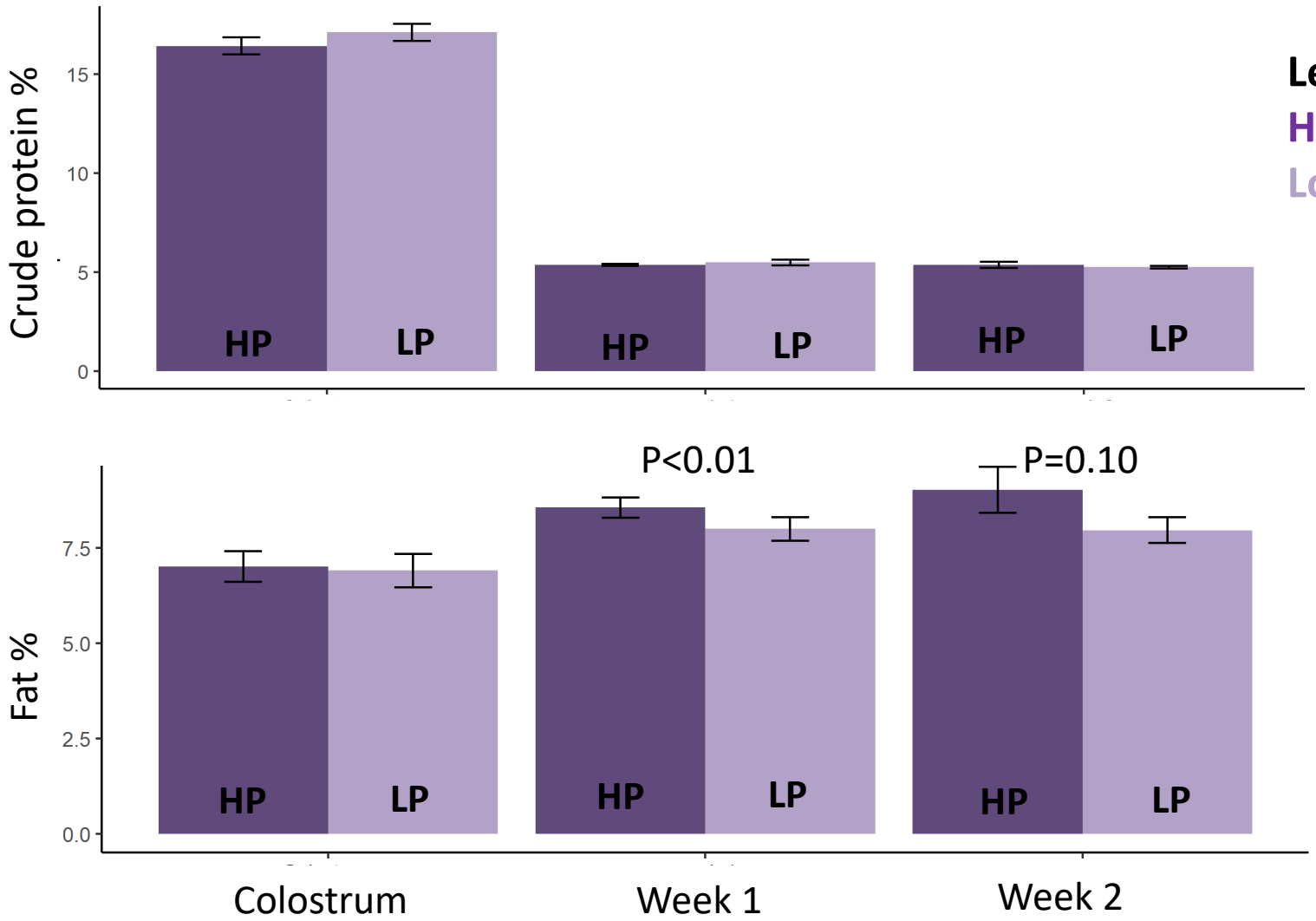
Urea concentration in serum

		High protein (n=18)		Low protein (n=17)		
	Measurement (rel. to farrowing)	**Mean.**	**SE**	**Mean.**	**SE**	**p-value**
Urea (mg/dL)	6 weeks before	21.36	1.27	21.33	1.04	0.90
	1 week before	24.59	1.26	15.73	0.69	<0.01

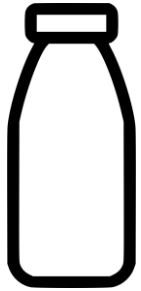
Total protein + fat in milk



Legend

High protein (HP) diet

Low protein (LP) diet



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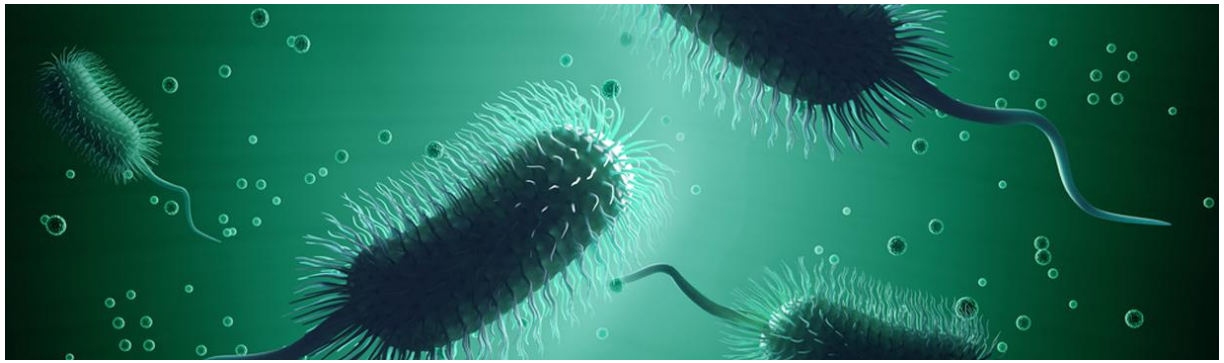
E. coli shedding

E. coli (log CFUs/g faeces)	Measurement (rel. to farrowing)	High protein (n=18)		Low protein (n=17)		p-value
		Mean	SE	Mean.	SE	
Average (period)		7.08	0.12	6.98	0.13	0.13
Before treatment	6 weeks before	6.43	0.24	6.46	0.24	0.65
During treatment	1 week before	7.50	0.07	7.73	0.07	0.92
After treatment (lactation)	3 weeks after	7.55	0.08	7.59	0.08	0.94



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Conclusion

1. A balanced CP diet has not influenced performance of the sow or the piglet
2. No significant difference observed in crude protein levels in colostrum, but higher fat content in milk of HP.
3. No difference between treatment groups, but an increase in CFUs over time observed in E. coli shedding

Thank you for your attention

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Instituut voor Landbouw-,
Visserij- en Voedingsonderzoek

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Kikianne Kroeske
kikianne.kroeske@ilvo.vlaanderen.be