

Effects of high fiber intake in late gestating sows on colostrum production and piglet performance

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Introduction

Dietary fiber given to gestating sows increased piglet weight gain in early lactation (Guillemet *et al.* 2007, Oliviero *et al.* 2009)

Piglet weight gain during early lactation is mainly influenced by colostrum intake (Devillers *et al.* 2011)

Colostrum intake by piglets depends on:

- the ability of the piglet to extract colostrum from teats
- **sow colostrum yield**

Colostrum production by the sow is under hormonal control: prolactin and progesterone (Taverne *et al.* 1998, Farmer *et al.* 1995)

Dietary fiber tended to increase peripartum prolactin concentrations (Farmer *et al.* 1998, Quesnel *et al.* 2009)



HYPOTHESIS

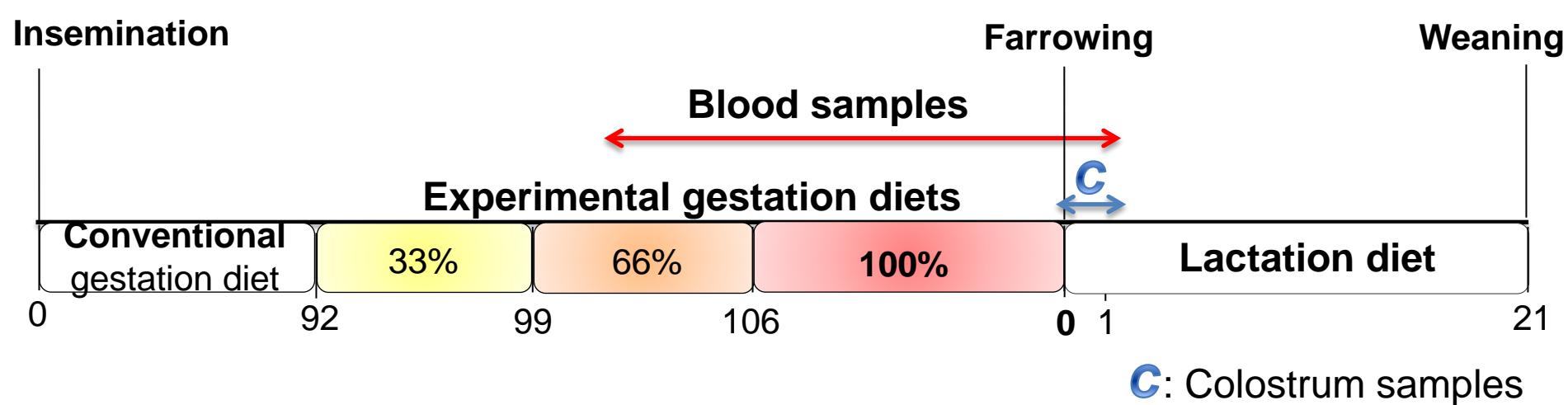
High fiber intake during late pregnancy could
induce peripartum endocrine changes that
increase sow colostrum yield
and in turn, influence piglet performance during
lactation

Experimental Diets

	Low Fiber (LF)	High Fiber (HF)
Total dietary fiber, %	13.3	23.4
Insoluble fiber, %	11.4	20.6
Soluble fiber, %	1.9	2.8
Composition, %		
Barley	41.7	31.3
Wheat	41.7	31.3
Soybean meal	11.5	1.5
Soybean hulls	0	8
Wheat bran	0	8
Sunflower meal (undecorticated)	0	8
Sugar beet pulp	0	8
Net energy, MJ/d	25.8	25.8

Experimental Design

29 primiparous sows Landrace X Large White (14 **LF**; 15 **HF**)



C: Colostrum samples

Piglet weight:

- 0-24 h: individual colostrum intake (Devillers *et al.* 2004)
 - **Sow colostrum yield** = \sum individual colostrum intakes
- 7 and 21 d of lactation

Biological analyses:

- Blood: progesterone and prolactin
- Colostrum: composition, IgG, IgA

Piglet Performance 0-24 h

	Low Fiber	High Fiber	<i>P</i>
Litter size at birth			
Total born	14.8	14.9	NS
Born alive	14.2	14.5	NS
Mean piglet body weight			
At birth, kg	1.28	1.27	NS
At 24 h, kg	1.39	1.37	NS
Mean colostrum intake, g	309	283	NS
Mortality, %	8.5	6.9	NS
Colostrum yield, kg	3.9	3.8	NS

NS $P > 0.10$

Dietary fiber did not influence piglet colostrum intake or sow colostrum yield

Piglet Performance 0-24 h

Low birth weight piglets (< 900 g)

	Low Fiber	High Fiber	<i>P</i>
No.	30	31	
Mean piglet body weight, g			
At birth	759	719	NS
At 24 h	788	796	NS
Mean piglet colostum intake, g	137	216	0.02
Birth to suckling interval, min	40	33	0.16

NS $P > 0,10$

Dietary fiber increased colostrum intake of low birth weight piglets

Hypotheses:

- **Piglet vitality at birth?**
- **Maternal behaviour?**

Piglet Performance 1-21 d

	Low Fiber	High Fiber	<i>P</i>
Litter size (after crossfostering)	12.6	12.0	NS
Mean piglet body weight, kg			
7 d	2.61	2.56	NS
21 d	6.32	6.15	NS
Mortality, %	14.7	6.2	0.01

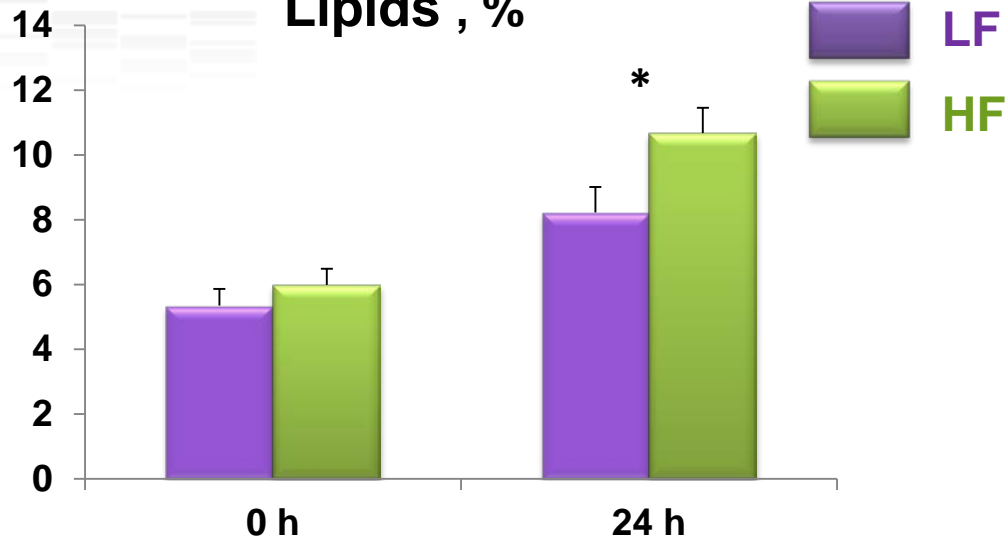
NS $P > 0.10$

Dietary fiber decreased piglet mortality

- Lower mortality rate of low birth weight piglets
- Colostrum composition

Colostrum composition

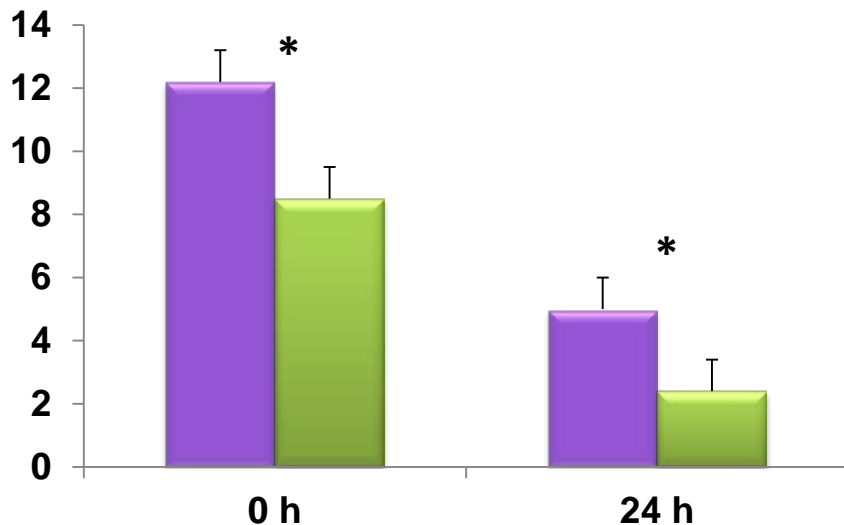
Lipids, %



Lipid intake may influence piglet survival (Pettigrew 1981)

No influence on dry matter, lactose and energy content

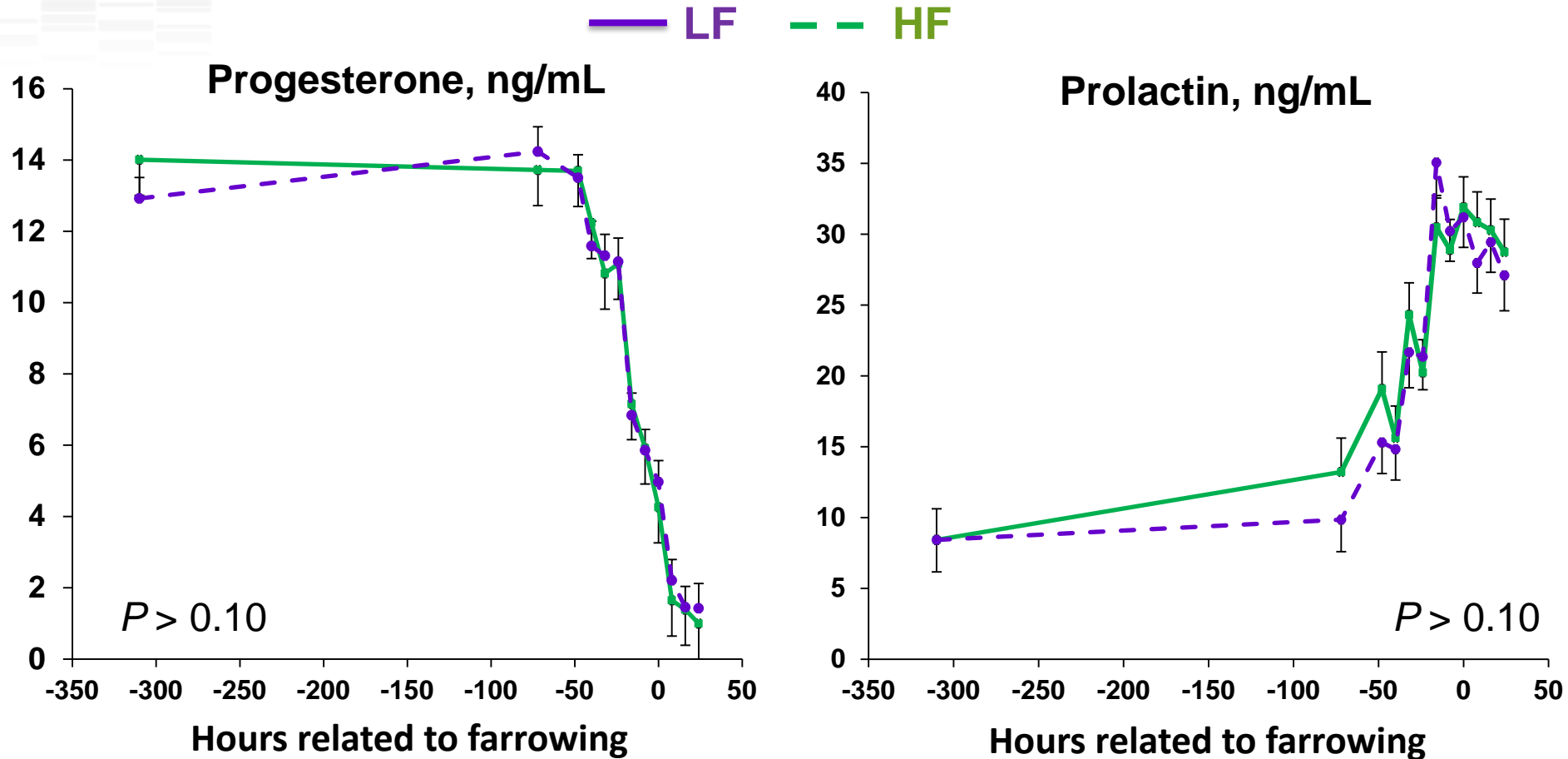
IgA, mg/mL



Dietary fiber decreased IgA concentration in colostrum

* : $P < 0.05$

Hormonal profile during the peripartum period



Dietary fiber did not influence progesterone and prolactin concentrations during the peripartum period

Conclusion

Increasing dietary fiber intake in late gestating sows

- **Did not influence colostrum yield or piglet weight gain during lactation**
- **Increased colostrum intake of low birth weight piglets**
- **Decreased piglet mortality during lactation**
- **Influenced colostrum composition**
- **These effects were not related to a change in progesterone and prolactin concentrations during the peripartum period**

Potential role of maternal behaviour and piglet vitality at birth?



**Thank you
for your
attention**