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**:Bovine colostrum: an efficient  
: and cost-effective growth  
: promoter in piglet weaning diet**

**Session 18, Abstract N°3291**



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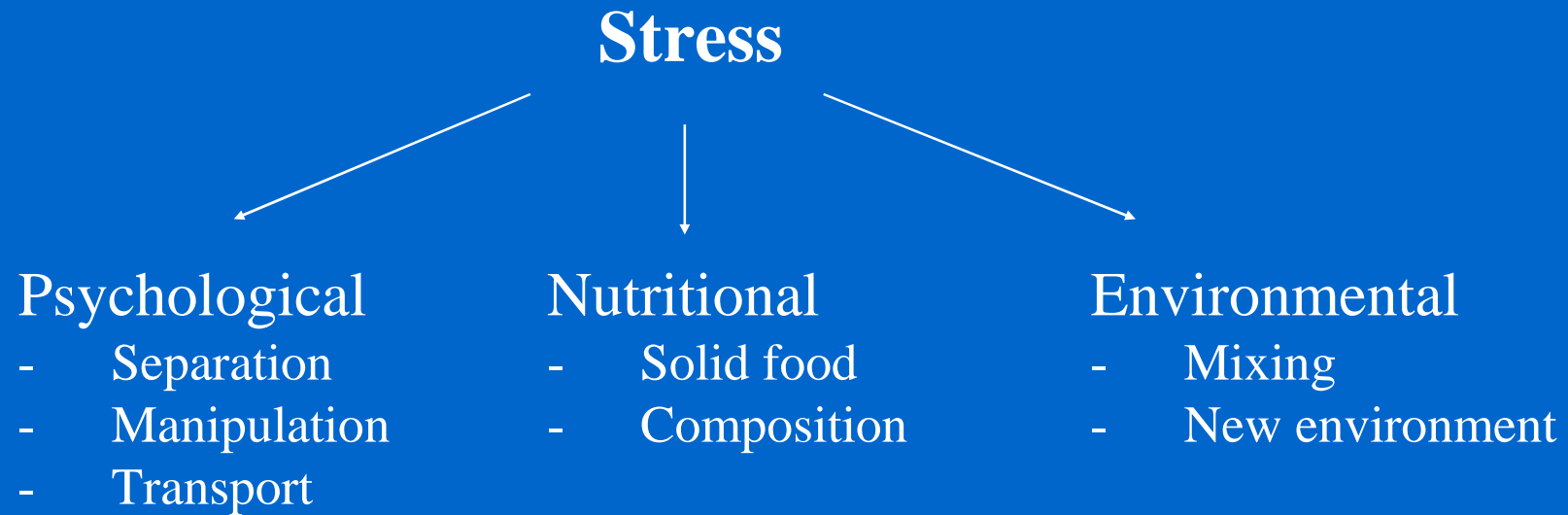
# Introduction



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# *Introduction*

- Weaning = Critical period



# *Introduction*

- Effects of weaning
  - Underfeeding
  - Intestinal modifications
    - Morphological
    - Immunological
    - Digestion and absorption
    - Intestinal flora
  - Metabolic modifications
  - Endocrinal modifications
- Use of feed additives
  - Ban on antibiotics
  - Colostrum as alternative

Economical  
Impact

# *Introduction*

- Bovine Colostrum
  - 1<sup>st</sup> milking
  - Composition :
    - Essential nutrients
    - Bioactive compounds :
      - Growth factors (IGF-I and –II, GH, EGF, TGF)
      - Immunologic defence factors (Ig, cytokines)
      - Non-immunologic defence factors (lactoferrin, lactoperoxidase, lysozymes)

<b>Composition (/l)</b>	<b>Colostrum</b>	<b>Milk</b>
<b>Dry Matter</b>	<b>239 g</b>	<b>129 g</b>
<b>Crude Proteins</b>	<b>140 g</b>	<b>40 g</b>
<b>Crude Fat</b>	<b>67 g</b>	<b>40 g</b>
<b>Lactose</b>	<b>27 g</b>	<b>49 g</b>
<b>Ash</b>	<b>11,1 g</b>	<b>7,4 g</b>
<b>IgA</b>	<b>3,2-6,2 g</b>	<b>0,2 g</b>
<b>IgG1</b>	<b>48-87 g</b>	<b>0,4 g</b>
<b>IgG2</b>	<b>1,6-2,9 g</b>	<b>0,05 g</b>
<b>IgM</b>	<b>3,7-6,1 g</b>	<b>0,05 g</b>
<b>IGF-I</b>	<b>0,1-2 mg</b>	<b>25 µg</b>
<b>IGF-II</b>	<b>0,1-2 mg</b>	<b>2 µg</b>
<b>TGF-β</b>	<b>20-40 µg</b>	<b>1-2 µg</b>
<b>EGF</b>	<b>4-8 µg</b>	<b>2 µg</b>
<b>Lactoferrin</b>	<b>1,5-2 g</b>	<b>0,1 g</b>
<b>Lysozyme</b>	<b>0,1-0,7 mg</b>	<b>0,1-0,3 mg</b>
<b>Lactoperoxidase</b>	<b>30 mg</b>	<b>20 mg</b>
<b>GH</b>	<b>3-10 ng</b>	<b>nd</b>
<b>Insulin</b>	<b>20-50 µg</b>	<b>nd</b>

# *Introduction*

- Bovine Colostrum
  - 1<sup>st</sup> milking
  - Composition :
    - Essential nutrients
    - Bioactive compounds
  - Availability :
    - Colostrum Bank
    - 80 000 litres collected/year WR

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## *Introduction*

- Bovine colostrum in weaning diet
  - ↗ ADG and ADFI Week 1 PW
  - ↘ FCR Week 1 PW



References	BC supplementation		Piglets		Effects of BC vs. control treatment
	Description	g.kg <sup>-1</sup> feed	n	Weaning age	
Pluske <i>et al.</i> , 1999	BC powder rich in IgG	0, 50 and 100 during 10 d	131	28 d	↗ADG Week 1 and 2 PW ≈ ADFI and FCR ↘ Days to slaughter
King <i>et al.</i> , 2001	Spray-dried BC	0 and 60 during 7 d	110	28 d	≈ ADG and FCR ↗ADFI Week 1 PW
Dunshea <i>et al.</i> , 2002	Freeze-dried BC	0 and 60 during 7d	24	14 d	≈ ADG, ADFI and FCR
Le Huerö-Luron <i>et al.</i> , 2004	Freeze-dried BC	0 and 40 during 11 d in uncleaned pens	150	28 d	↗ADG Week 1 and 2 PW ↗ADFI Week 1 PW ↘FCR Week 1 PW
		0, 20 and 40 during 14 d in clean pens	12	21 d	↗ADG d5-d7 PW ≈ ADFI and FCR
Le Huerö-Luron <i>et al.</i> , 2008	Freeze-dried BC	0 and 30 during 12 d	60	28 d	↗ADG and ADFI Week 1 PW ↘FCR Week 1 PW

# Introduction

- Bovine colostrum in weaning diet
  - Boudry *et al.*, 2008. (*Animal*, 2 : 730-737).
    - 20 g/kg of freeze-dried BC Whey for 10 d, then 10 g/kg for 18 d
    - commercial weaning-diet without feed additives
    - weaned piglets (28 d)
    - n = 48 (4 \* 12)
    - Measures : Weekly ADG, ADFI, FCR
    - Results :
      - ↗ ADG (+ 100 %) and ADFI (+ 35 %) Week 1 PW
      - ↘ FCR (- 50 %) Week 1 PW
    - Cost : **1.9 €/piglet**

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# Experiments



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# Objectives

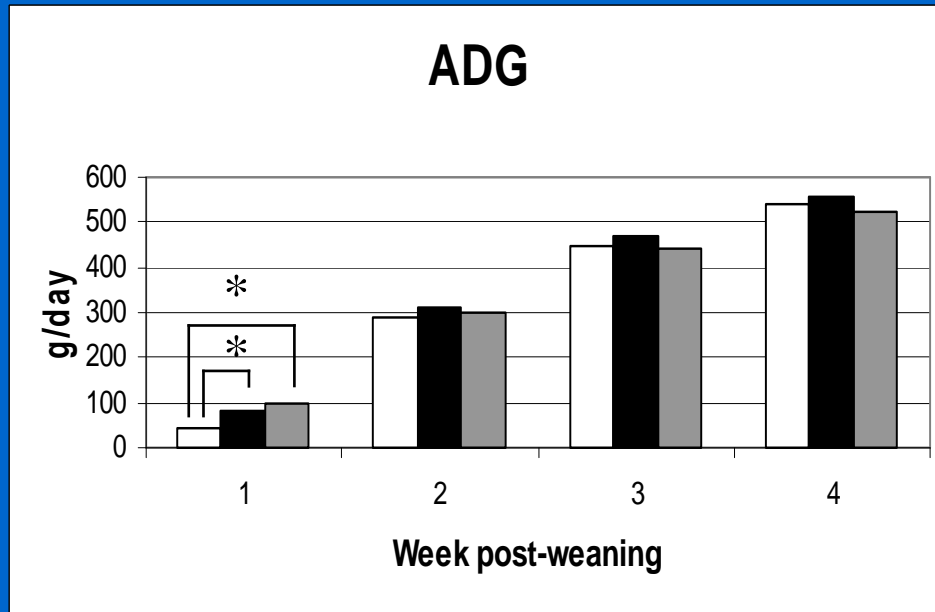
- Reduce the costs of the use of bovine colostrum :
  - Level of incorporation (Experiment 1)
  - Duration of administration (Experiment 2)
  - BC fraction (Experiment 3)

# Experiment 1

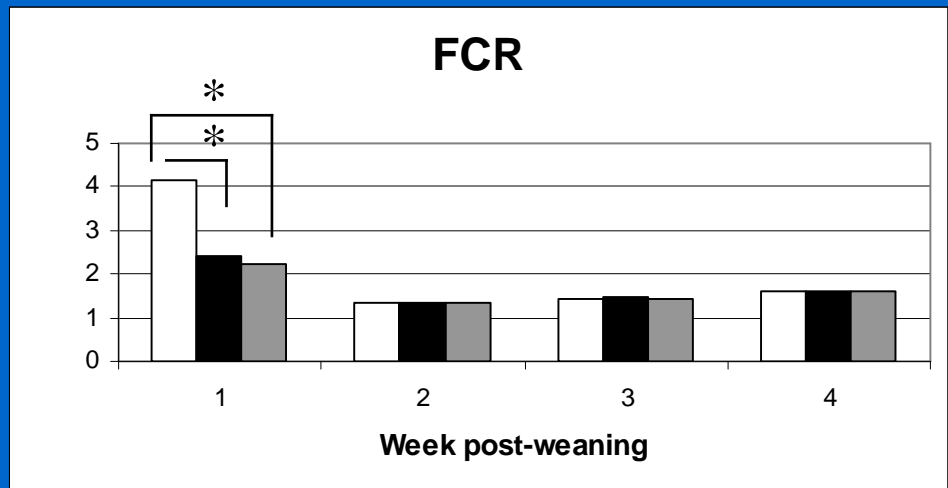
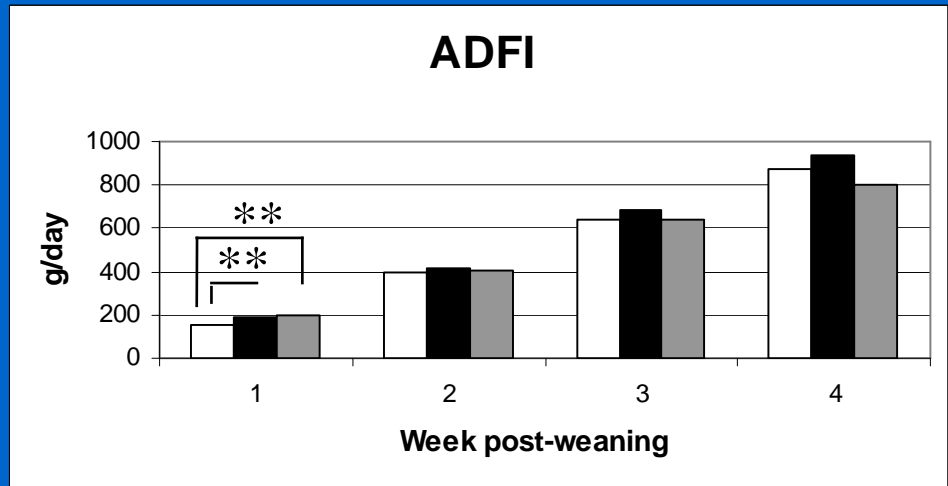
- *Experimental design*
  - 0, 10 or 20 g/kg of freeze-dried BC Whey for 28 d
  - commercial weaning-diet without feed additives
  - weaned piglets (28 d)
  - n = 39 (3 \* 13)
  - Measures :
    - Weekly ADG, ADFI, FCR
    - Daily ADFI the 1<sup>st</sup> week PW
    - Visual control of diarrhoea

# Experiment 1

- *Results*

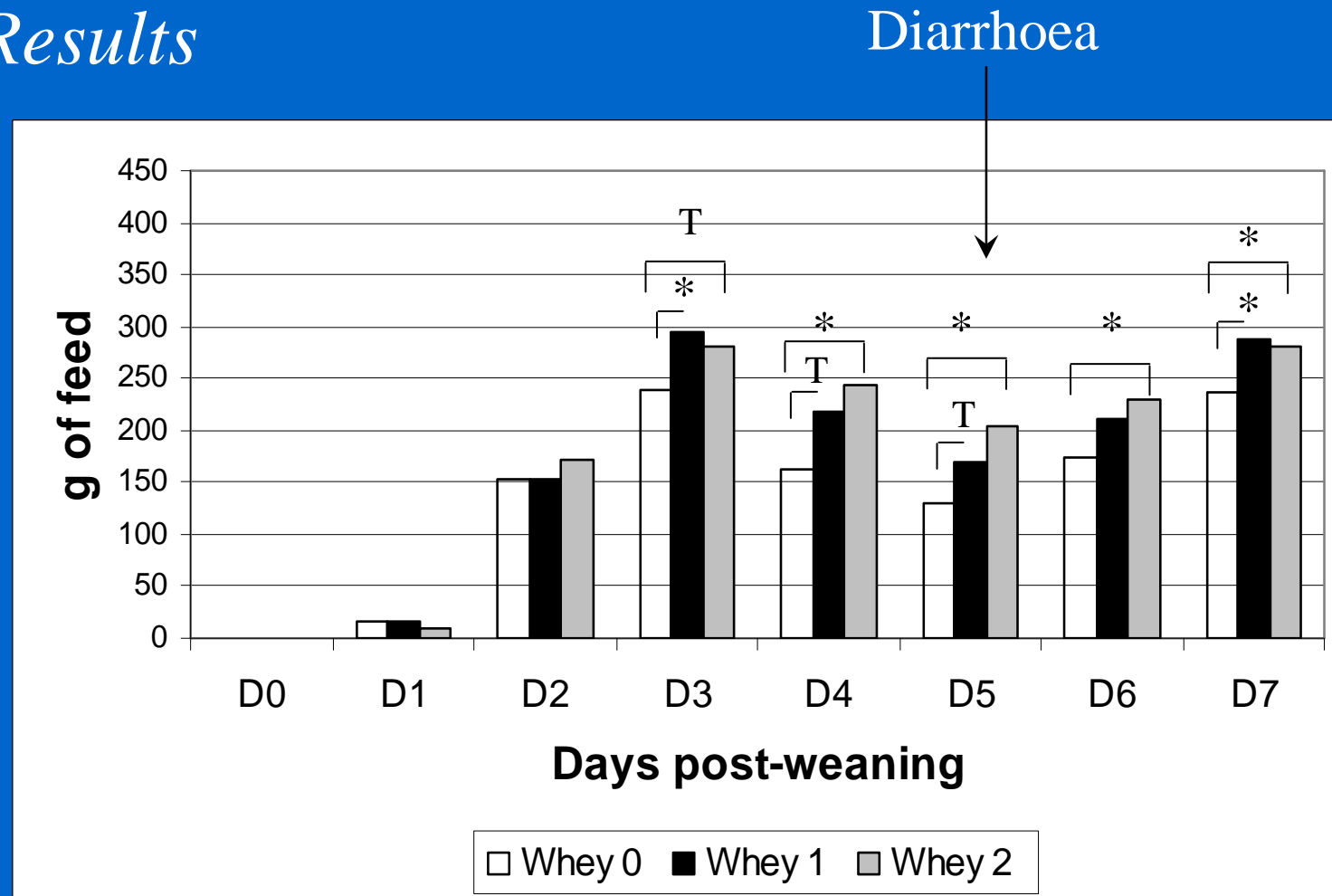


□ Whey 0   ■ Whey 1   ■ Whey 2



# Experiment 1

- *Results*



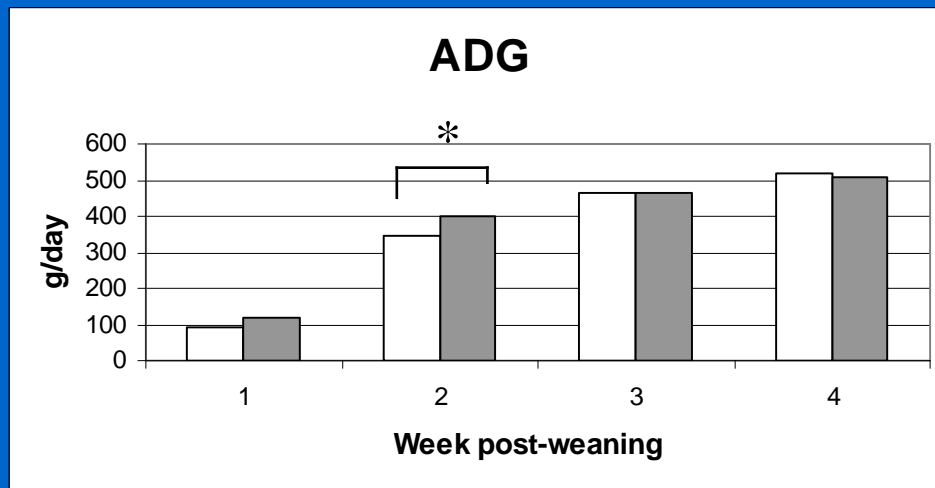
## Experiment 2

- *Experimental design*
  - 0, 20 g/kg of freeze-dried BC Whey for 10 d
  - commercial weaning-diet without feed additives
  - weaned piglets (28 d)
  - n = 48 (4 \* 12)
  - Measures :
    - Weekly ADG, ADFI, FCR for 28 d
    - Daily ADFI the 1<sup>st</sup> week PW
    - Visual control of diarrhoea

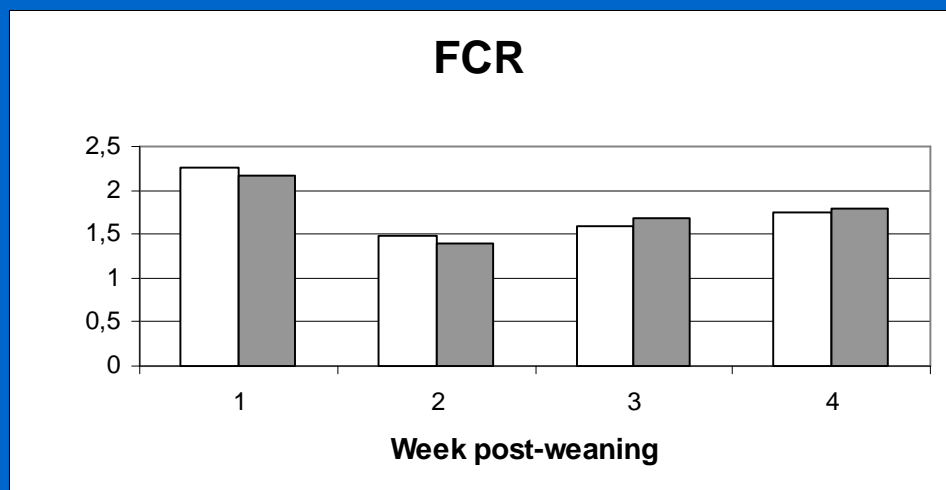
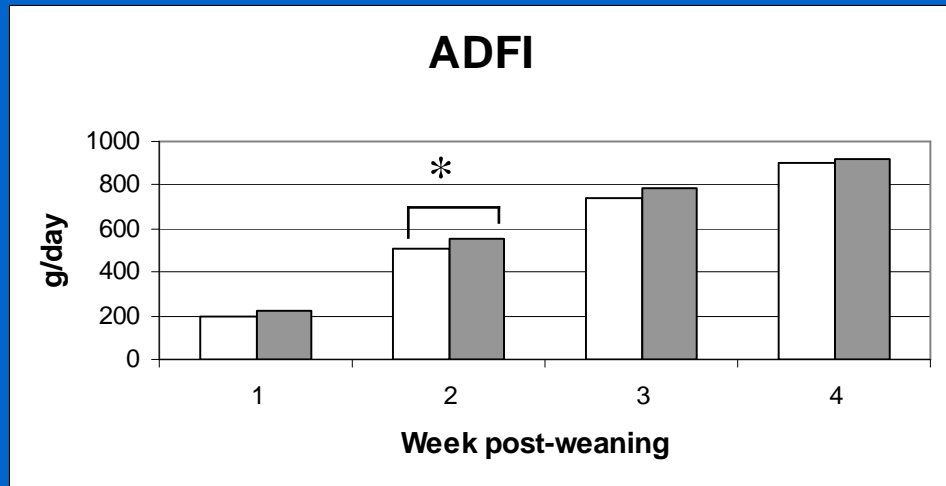


# Experiment 2

- *Results*



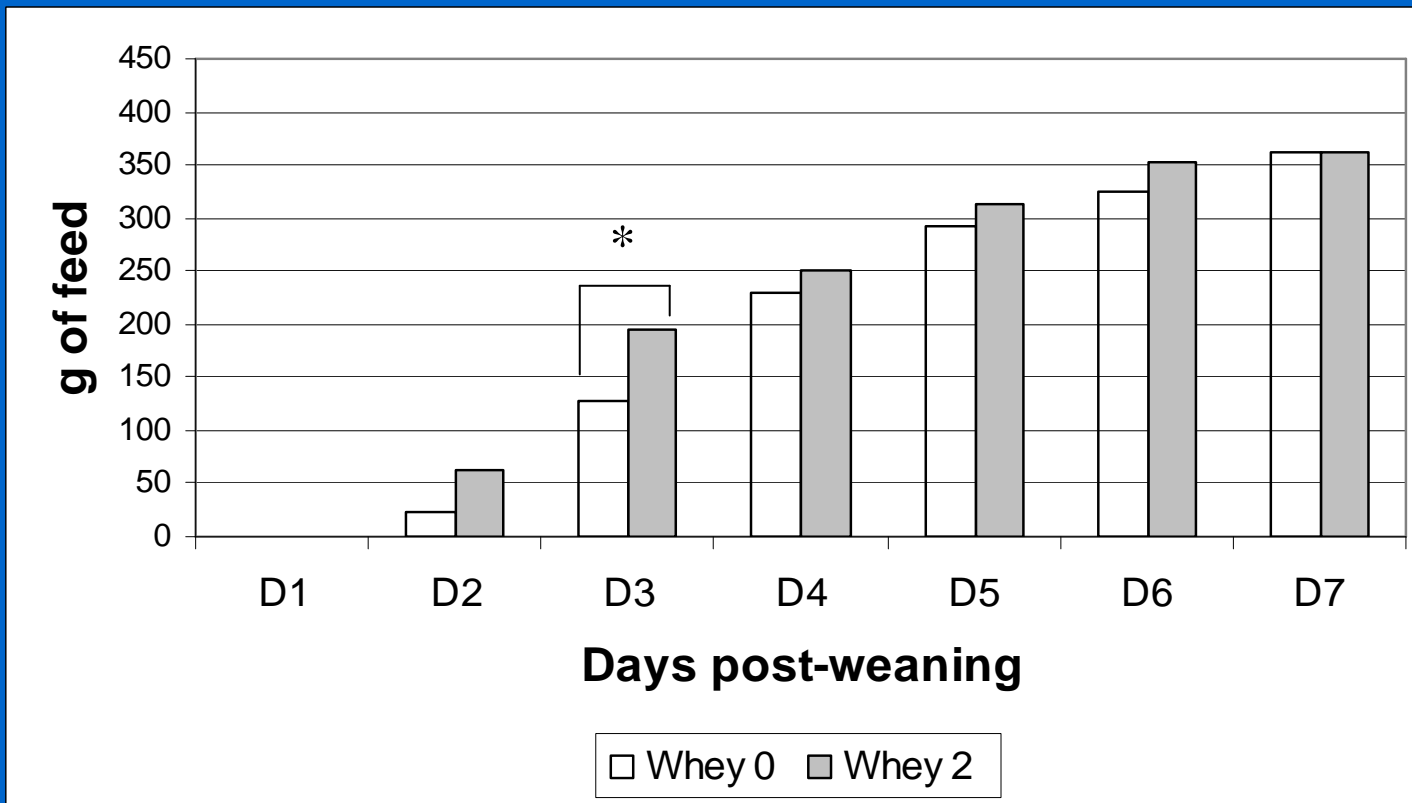
□ Whey 0    ■ Whey 2



# Experiment 2

- *Results*

No Diarrhoea

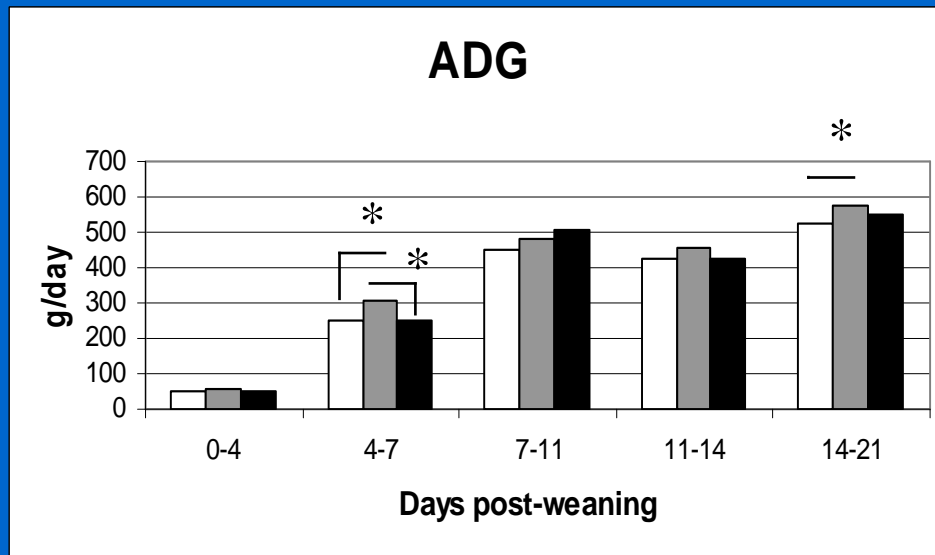


# Experiment 3

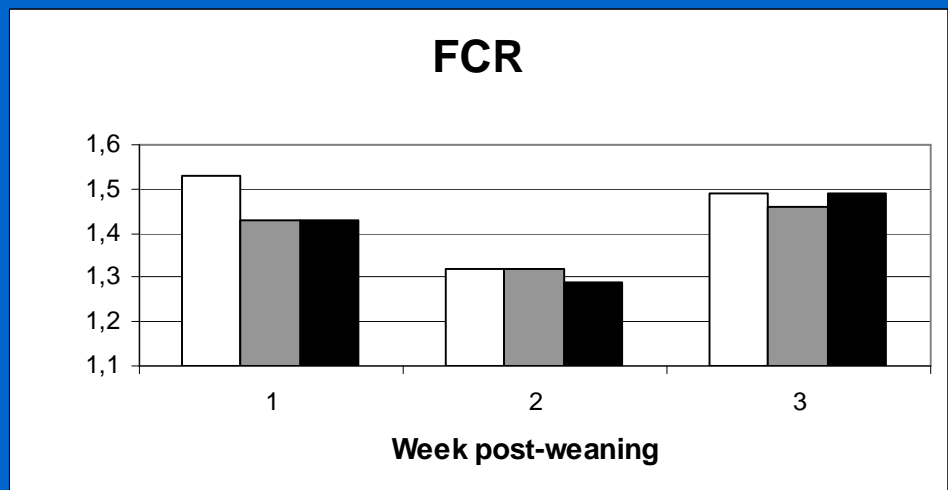
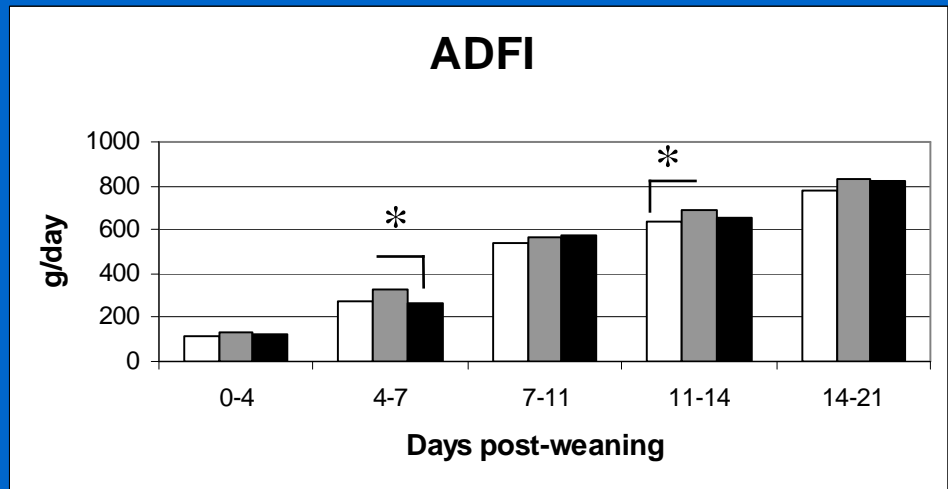
- *Experimental design*
  - 10 g/kg of freeze-dried BC Whey, defatted BC or 10 g of milk for 10 d
  - commercial weaning-diet without feed additives
  - weaned piglets (28 d)
  - $n = 32 (8 * 4)$
  - Measures :
    - Weekly ADG, ADFI, FCR for 28 d
    - Daily ADFI the 1<sup>st</sup> week PW
    - Visual control of diarrhoea
    - E. coli counts in faeces

# Experiment 3

- *Results*



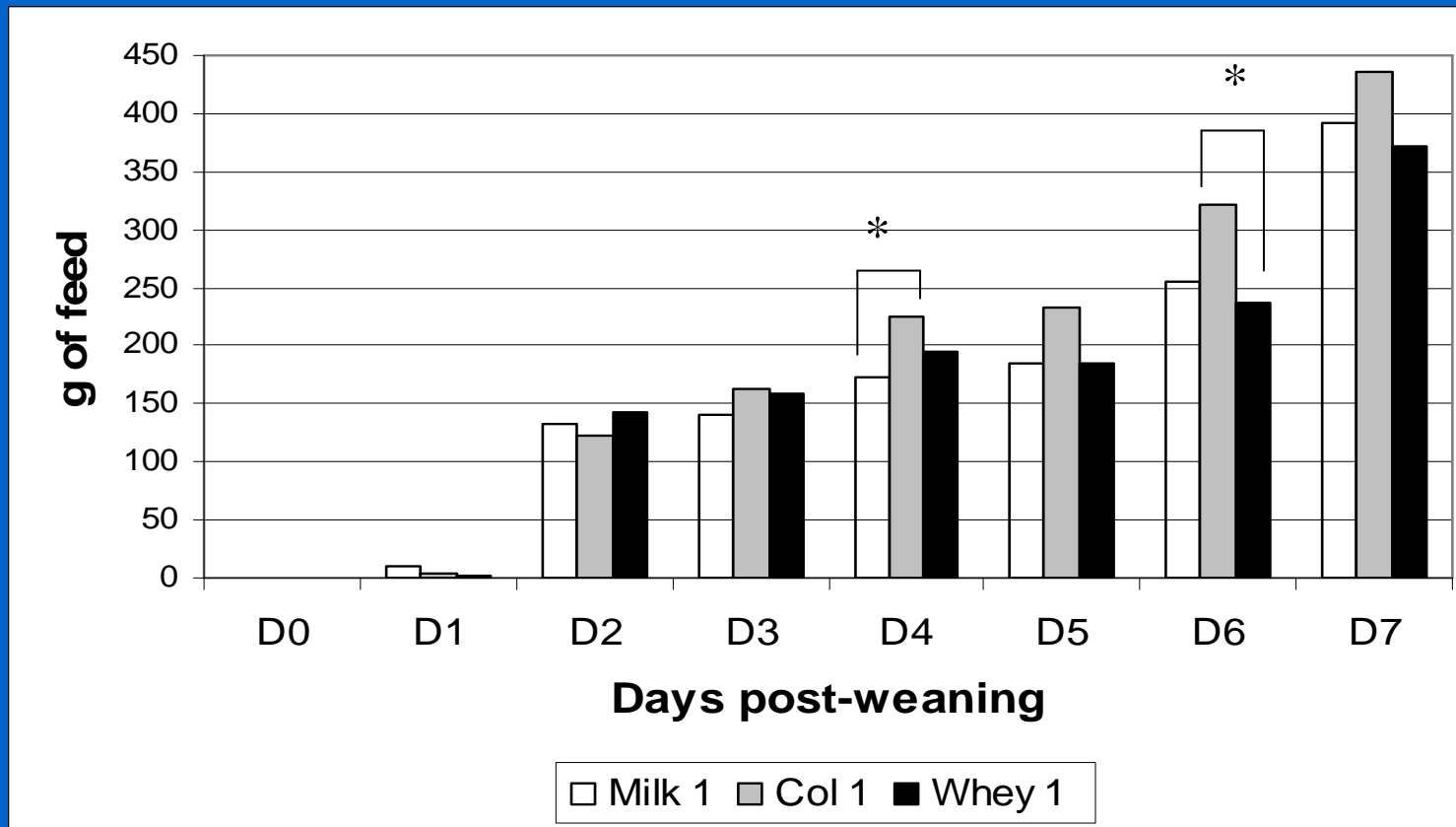
□ Milk 1    ■ Col 1    ■ Whey 1



# Experiment 3

- *Results*

No Diarrhoea



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# Conclusion and perspectives



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## Conclusion

- *Growth promoting action confirmed*
- *Effect of the environment*
- *Costs reduced*
  - *1.9 €/piglet → 0.14 €/piglet*