EFFECTS OF WEANING CONDITIONS ON METABOLIC PARAMETERS, GROWTH AND HEALTH OF PIGLETS

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Introduction

Weaning in pig production

- Reduction of the use of antibiotics
- Animal welfare
- Profitability

Identification of biomarkers of the robustness of piglets at weaning
Can metabolic parameters be used as biomarkers of adaptation to weaning? How do they change according to weaning conditions?
## Material and Methods

- 4 groups of 16 animals
- Weaning at 21 or 28 days of age (to dissociate weaning from age effect)
- Deteriorated or Optimal Conditions

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Optimal (OC)</th>
<th>Deteriorated (DC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density</td>
<td>4 piglets/pen</td>
<td>8 piglets/pen</td>
</tr>
<tr>
<td>Animals mixing</td>
<td>2 litters/pen</td>
<td>8 litters/pen</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Animals mixing 1 week after weaning</td>
</tr>
<tr>
<td>Room cleanliness</td>
<td>Cleaned + disinfected</td>
<td>Non Cleaned + non disinfected</td>
</tr>
<tr>
<td>Temperature during animals transfer</td>
<td>Directly at 28°C</td>
<td>4h waiting at 20°C</td>
</tr>
<tr>
<td>Transition feed 1st Age/2nd age</td>
<td>On 3 days</td>
<td>Direct</td>
</tr>
</tbody>
</table>

- No antibiotic treatment
- Blood samplings in fasting state, weighing and clinical observations from 12 to 61 days of age
Reduction of growth rate around weaning

**Average Daily Weight Gain**

- **Time***
- **Cond**
- **Age at weaning NS**
- **Time*Cond***
- **Time*Age at weaning NS**
- **Cond*Age at weaning NS**

Graph showing the average daily weight gain with time and conditions leading to a reduction around weaning.
More severe reduction of growth rate in deteriorated conditions around weaning

Average Daily Weight Gain

- Optimal conditions
- Deteriorated conditions

No effect of age at weaning

Time ***
Cond **
Time*Cond ***
Age at weaning: NS
Time*Age at weaning NS
Cond*Age at weaning NS
Lipid catabolism increased at weaning

- Transient ↑ NEFA after weaning
- ↓ Glucose starting at weaning
No apparent effect of management conditions on glucose and lipid metabolism.
Higher protein catabolism at weaning

**Urea**
(total protein catabolism)

**Creatinine**
(muscle protein catabolism)
Higher protein catabolism at weaning for piglets in deteriorated conditions.

**Urea**
- Time ***
- Cond NS
- Age at weaning NS
- Time*Cond NS
- Time*Age at weaning NS
- Cond*Age at weaning NS

**Creatinine**
- Time ***
- Cond NS
- Age at weaning **
- Time*Cond **
- Time*Age at weaning NS
- Cond*Age at weaning NS

+122 vs +80
More diarrhea in deteriorated conditions

- More piglets with diarrhea in deteriorated conditions
- More severe slowing down of growth for piglets with diarrhea
No effect of diarrhea on energy parameters

Non Esterified Fatty Acid (NEFA)

- 0 day with diarrhea
- >=1 day with diarrhea

Glucose

- 0 day with diarrhea
- >=1 day with diarrhea
Greater protein catabolism after weaning for piglets with diarrhea

- Higher urea after weaning for piglets with diarrhea
- Higher creatinine after weaning for piglets with diarrhea
Conclusion

Feed Intake

Catabolism

Nutrients available

NEFA

Urea

Lipid

Protein

Creat

Muscle breakdown

Basal metabolism and adaptation to weaning (homeostasis, immunity)

Growth

WEANING & DIARRHEA

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Take home message

There is an opportunity to use these molecules as markers of adaptation to weaning.
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  - Experimental facilities
  - Lab
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