Effects of energy supplementation to low-birth weight neonatal piglets on their survival, growth and blood glucose level.

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The context

- Large litters increased
  - Litter weight variability
  - Prevalence of low birth weight piglets

- Neonatal mortality
  - Low body energy reserves
Energy reserves of the newborn piglet

<table>
<thead>
<tr>
<th>Source</th>
<th>Type</th>
<th>Available energy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liver</td>
<td>Glycogen</td>
<td>43 kJ/kg BW</td>
</tr>
<tr>
<td>Muscle</td>
<td>Glycogen</td>
<td>209 kJ/kg BW</td>
</tr>
<tr>
<td>Body (non-structural body fat)</td>
<td>Lipids</td>
<td>175 kJ/kg BW</td>
</tr>
</tbody>
</table>

Total 427 kJ/kg BW

(Mellor and Cockburn, 1986)
The context

- Large litters increased
  - Litter weight variability
  - Prevalence of low birth weight piglets

- Neonatal mortality
  - Low body energy reserves
  - Failure to acquire energy (Thorup et al., 2015)
  - Low birth weight piglets = rapid depletion
Energy needs of the newborn piglet

<table>
<thead>
<tr>
<th>Ambient temperature range</th>
<th>Energy required</th>
<th>Sustained heat production autonomy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Normal birth weight piglet</td>
</tr>
<tr>
<td>32-38°C</td>
<td>9.5 kJ/h/kg BW</td>
<td>31 h</td>
</tr>
<tr>
<td>18-26°C</td>
<td>27 kJ/h/kg BW</td>
<td>15 h</td>
</tr>
<tr>
<td>0-10°C</td>
<td>43 kJ/h/kg BW</td>
<td>58 h</td>
</tr>
</tbody>
</table>

(Mellor and Cockburn, 1986)
Energy supplementation at birth

- Increases survival and growth *(Decleck et al., 2016)*
- Medium-chain fatty acids *(Herpin et al., 2002; Lepine et al., 1989)*
- Commercially available products

Assess the effects of energy supplementation
Compare an elaborated product to a raw source of energy

PILOT STUDY
Methods

27 sows – 3 weeks batch farrow

Birth-Weight < 1.10 kg
(30% total born)
Methods

- Piglets left on their dam
  - Random assignment within sow
  - Litter size = 13 piglets
- Targeted for birth weight < 1.10 kg
- Recruitment
  - Live birth
  - <3h post-partum (video camera)

Coconut = 35 piglets (M:F=0.84)
Water = 35 piglets (M:F=0.94)
Energyn = 34 piglets (M:F=1.13)
Data collection and analysis

- **Data collection:**
  - Weights: D0 (birth), D1, D7, D14, D21, Weaning
  - Glucose: 24 h after supplementation (D1)
  - Mortality: as occurred

- **Statistics:** General Linear Model
  - random effect of **sow**
  - repeated effect of **day**

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Survival

Treatment: NS

Percentage of mortality

- Water
- Coconut
- Energyn
Weights

Day: P < 0.001
Treatment: NS
Treatment*Day: NS
Growth

Treatment: NS

Average daily gain of pigs (kg/day)

- Coconut
- Energyn
- Water

D0-D1
D0-D7
D0-D14
D0-D21
D0-D27
Blood glucose concentration (mg/L)

Treatment: NS

- Water
- Coconut
- Energyn
Discussion

- No effect of supplementation on survival, growth, or blood glucose content
  - Pilot study
  - High health standards piggery
  - 2 ml enough? 71 – 74 KJ = 15h heat production
To be continued…

- Large scale study:
  - Extra treatment: no supplementation
  - Further measures:
    » Baseline blood glucose content at birth
    » Colostrum quality of sows
    » Vitality of piglets
    » Body temperature
    » Cognitive abilities after weaning
THANK YOU

Moorepark pig research unit staff
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Research assistants: Aurelie Poidevin

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