The frequency of emptying slurry on gas and odours emitted by piggeries equipped with flushing systems

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**Best Available Technique**

BREF Intensive Rearing of Poultry and Pigs (IRPP BREF)

Industrial Emission Directive (2010/75/UE)
*Replace IPPC directive*

- NH₃
- Water
- Energy

Scraping
Slurry management
Flushing

Recirculation liquid
Frequency

+ 2000 pigs (+ 30kg)
750 sows
Experimental design

2 Batches of 144 crossbred pigs

Concrete fully slatted floor
- Set-point temperature: 24°C
- Fresh air: ceiling of perforated sheeting
- Air exhaust: under floor extraction

Management of the slurry
Experimental design

- **Reference**
  - Slurry stored in the pit

- **F2**
  - Removed twice a day
  - Recirculation liquid = liquid fraction of the slurry

- **F4**
  - Removed four times a day
  - Recirculation liquid = liquid fraction of the slurry
Measurements

- Reference
- Ventilation rate
- Temperature Hygrometry
- NH$_3$ and GHG
- Weight Feed Water
- Slurry (volume – composition)
- Odour

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## Ambient parameters

<table>
<thead>
<tr>
<th></th>
<th>Reference</th>
<th>F2</th>
<th>F4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B1 (April to July)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outdoor temperature (°C)</td>
<td>16,9±7,4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature (°C)</td>
<td>27,4±3,7</td>
<td>27,8±3,6</td>
<td>28,7±4,4</td>
</tr>
<tr>
<td>Ventilation rate (m³ per hour per pig)</td>
<td>31,3±13,6</td>
<td>31,4±13,0</td>
<td>31,2±12,9</td>
</tr>
<tr>
<td></td>
<td>B2 (Sept to Dec)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outdoor temperature (°C)</td>
<td>10,8±6,3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature (°C)</td>
<td>25,3±2,0</td>
<td>25,0±2,1</td>
<td>24,6±2,2</td>
</tr>
<tr>
<td>Ventilation rate (m³ per hour per pig)</td>
<td>31,2±11,9</td>
<td>29,3±11,8</td>
<td>29,5±11,6</td>
</tr>
</tbody>
</table>
ADG (g.d⁻¹)

- B1: F4 > F2 and Reference
- B2: no difference

FCR

- B1: F4 > F2 and Reference
- B2: no difference
## Gaseous emissions

<table>
<thead>
<tr>
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</tr>
</thead>
</table>
| **N\_NH\_3**  
(g per pig per day) | | | |
| B1     | 3,0       | 3,4 | 3,6 |
|        | +13%      | +20%|     |
| B2     | 3,8       | 4,9 | 3,9 |
|        | +29%      |     |     |
| **N\_N\_2\_O**  
(g per pig per day) | | | |
| B1     | 0,5       | 0,5 | 0,5 |
|        | +40%      |     |     |
| B2     | 0,5       | 0,7 | 0,5 |
## Gaseous emissions

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</tr>
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<tr>
<td>( C_{CH_4} ) (g per pig per day)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1</td>
<td>9.1</td>
<td>6.8</td>
<td>5.9</td>
</tr>
<tr>
<td>B2</td>
<td>5.8</td>
<td>3.1</td>
<td>3.1</td>
</tr>
</tbody>
</table>

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<th>F4</th>
</tr>
</thead>
<tbody>
<tr>
<td>( C_{CO_2} ) (g per pig per day)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1</td>
<td>496</td>
<td>483</td>
<td>432</td>
</tr>
<tr>
<td>B2</td>
<td>589</td>
<td>581</td>
<td>563</td>
</tr>
</tbody>
</table>
Odours

Odour emission (10^6 ou.p.l.d^-1)

Fattening days

- day 8
- day 28
- day 49
- day 64
- day 78
- average

- Reference
- F2
- F4

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Limiting the duration of slurry storage inside the building

Reduction of gaseous emissions

Reduction of odors
Slurry agitation

Exchange surface air/fresh slurry

Slurry removal by flushing

Higher volatilization with higher frequencies?

Increase of volatilization

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Thank you for your attention !!!