Cost pressure, antibiotic reduction and the issue of animal welfare – phytogenic’s a helpful tool for a profitable pig production

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Improving Animal Performance & Economical Results

Sows
Recommendation of Use

Digestarom® utilization period

- Weaning
- Insemination
- 28.
- *Depending on barn temperature & housing system
- 84.
- 98.
- 112.
- Farrowing
- >10 piglets ad. lib.

approx. 33 MJ*

*Depending on barn temperature & housing system
Lower urea content in sow’s milk with Digestarom®

Source: Slov. Center of Agriculture, Nitra, 2007. 10th Meeting animal nutrition, Halle, Germany 2008
Improved Milk Quality

Source: Slov. Center of Agriculture, Nitra, 2007. 10th Meeting animal nutrition, Halle, Germany 2008
**Meta Analysis**

**More live born and weaned piglets/litter**

<table>
<thead>
<tr>
<th>Category</th>
<th>Control</th>
<th>Digestarom®</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total born</td>
<td>+2.7 %</td>
<td>+5.4 %</td>
</tr>
<tr>
<td>Live born</td>
<td>+5.4 %</td>
<td>+6.5 %</td>
</tr>
<tr>
<td>Stillborn</td>
<td>-46.3 %</td>
<td></td>
</tr>
<tr>
<td>Weaned</td>
<td></td>
<td>+6.5 %</td>
</tr>
</tbody>
</table>

Source: Khon Kaen University, Thailand, 2008 (Trial 286)
Higher Feed Intake

Scientific trial with Yorkshire x Landrace sows

Lactation feed intake

Lactation body weight loss

Source: Khon Kaen University, Thailand, 2008 (Trial 286)
**Higher Feed Intake Pays Off**

*Higher feed intake – better litter development*

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Digestarom®</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily feed intake/sow (kg)</td>
<td>5.77&lt;sup&gt;b&lt;/sup&gt;</td>
<td>6.35&lt;sup&gt;a&lt;/sup&gt;</td>
<td>+ 0.58</td>
</tr>
<tr>
<td>Daily milk yield per sow (l)</td>
<td>10.17&lt;sup&gt;b&lt;/sup&gt;</td>
<td>11.70&lt;sup&gt;a&lt;/sup&gt;</td>
<td>+ 1.53</td>
</tr>
<tr>
<td>Piglets with diarrhea (%)</td>
<td>14.84&lt;sup&gt;a&lt;/sup&gt;</td>
<td>7.19&lt;sup&gt;b&lt;/sup&gt;</td>
<td>- 51.5 %</td>
</tr>
<tr>
<td>Weaning weight/piglet (kg)</td>
<td>7.31&lt;sup&gt;b&lt;/sup&gt;</td>
<td>7.78&lt;sup&gt;a&lt;/sup&gt;</td>
<td>+ 6.4 %</td>
</tr>
<tr>
<td>Daily weight gain/piglet (g)</td>
<td>272&lt;sup&gt;b&lt;/sup&gt;</td>
<td>295&lt;sup&gt;a&lt;/sup&gt;</td>
<td>+ 8.5 %</td>
</tr>
<tr>
<td>Uniformity of weaned piglets (%)</td>
<td>79.19&lt;sup&gt;b&lt;/sup&gt;</td>
<td>82.67&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Weaned piglets/litter (21 days)</td>
<td>9.33&lt;sup&gt;b&lt;/sup&gt;</td>
<td>9.90&lt;sup&gt;a&lt;/sup&gt;</td>
<td>+ 0.57</td>
</tr>
</tbody>
</table>

<sup>a, b</sup> = significant difference (p< 0.05)

Source: Khon Kaen University, Thailand, 2008 (Trial 286)
Increased Energy Utilization

More efficient conversion of the ingested feed energy

- Energy intake: +10%
- Energy output through milk: +15%
- Energy necessary to rebuild lost body mass: -18%
- Efficacy of energy conversion into performance: +8%

Source: Khon Kaen University, Thailand, 2008, (Trial 286)
**Scientific trial with sows (n=6 per group)**
Crude protein (CP) intake and utilization


Increased Digestibility

- CP-intake: 111.1
- CP-excretion via faeces: 98.0
- Apparent digestibility: 111.8

Control = 100
Increased Productivity

Continuous Digestarom® application to feed insures maximum benefits

Source: Farm Reports, Brandenburg, Germany, 2010-2012
Increased Productivity

Performance consistency with Digestarom® - even in high parity numbers

*Piglet index = No. of live born piglets per 100 first services

Source: Farm Reports, Brandenburg, Germany, 2010-2012
Increased Productivity

Performance consistency with Digestarom® - even in high parity numbers

Piglet Index*
Apr.-Aug. 2010 - first cycle with Digestarom®
(1400 first services)


*Piglet index = No. of live born piglets per 100 first services

Source: Farm Reports, Brandenburg, Germany, 2010-2012
Improved Productivity

**Trial unit performance vs. best 25% of BSSB* - farms**

* **BSSB** = Brandenburg Pig Producers Controlling & Consultancy Association

Source: Farm & BSSB Reports, Brandenburg, Germany, 2011-2012
Performance Consistency

Data based on: RQPPA* – 64,913 mated sows
Trial unit – 4,808 mated sows (Digestarom®)

**Piglet index** = Live born piglets/100 first services

*RQPPA = Rhenish Quality Piglet Producers Association

**Piglet index** = Live born piglets/100 first services
Improved Productivity

Less need for selection with Digestarom® in a 10,000 sows unit

Sows culled for conception reasons (06.06.2011 - 16.06.2012)

Average Stock/herd

<table>
<thead>
<tr>
<th>Parity numbers</th>
<th>Control</th>
<th>Digestarom®</th>
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<tbody>
<tr>
<td>1</td>
<td>4724</td>
<td>4787</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Preliminary results of actual field test, Germany, 2012
Benefits in Sows

- More piglets born & weaned
- Less inflammatory processes in the mammary glands
- Better development of nursing piglets
- Higher feed intake & utilization through the sow
- Better fertility and performance consistency
- High cost effectiveness (ROI)
Digestarom

Improving Animal Performance & Economical Results

Piglets
Application in Pigs

- **Farrowing**: Digestarom® Start 300 g/t in prestarer
- **Weaning**: Digestarom® Grow 300 g/t in grower feed
- **Finishing**: Digestarom® Finish 150 g/t in grower/finisher feed

- **6-8 kg BW**: Digestarom® Start 300 g/t in starter feed
- **12-15 kg BW**: Digestarom® Grow 300 g/t in grower feed
- **26-28 kg BW**: Digestarom® Finish 150 g/t in grower/finisher feed
- **Slaughter**
Increased Performance

Less mortality in suckling piglets using Digestarom® in creep feed

Source: MaxAgro, Farm report, Chile, 2009

* = Standard Prestarter
Impact of Weaning

**Influence of weaning on feed intake**

Adapted from: Brooks and Tsiourgiannis, 2003
Increased Performance

**Performance enhancement after weaning - Feed intake**

![Graph showing increased feed intake](graph.png)

- **Source:** FU Berlin, 2007 (Trial 237)
Increased Performance

Performance enhancement after weaning – Body weight

Source: FU Berlin, 2007 (Trial 237)
Performance enhancement after weaning – FCR

Source: FU Berlin, 2007 (Trial 237)
Increased Performance

More homogeneous body weights

Design: 10 animals/group at 26 days of age
Duration: 21 days trial duration
Basal diet: 14.26 MJ ME, 20.65% CP, 3.8% Fat, 1.30% Lys

Source: Bunge Meat Industries Ltd., Australia, 2001 (Trial158)
## Improved Finishing Performance

### Commercial trial with growing-finishing pigs
Replacement of conventional flavor, AGP, sweetener

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Digestarom®</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rearing period (30 pigs/group)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial BW (kg)</td>
<td>14.27</td>
<td>13.99</td>
<td>- 0.28</td>
</tr>
<tr>
<td>Final BW (kg)</td>
<td>25.97</td>
<td>27.33</td>
<td>1.36</td>
</tr>
<tr>
<td>Total growth (kg)</td>
<td>11.69</td>
<td>13.34</td>
<td>1.65</td>
</tr>
<tr>
<td>Daily weight gain (g)</td>
<td>585</td>
<td>741</td>
<td>156</td>
</tr>
<tr>
<td>FCR</td>
<td>1,937</td>
<td>1,887</td>
<td>- 0.05</td>
</tr>
<tr>
<td>Feed cost/kg growth (€)</td>
<td>0.74</td>
<td>0.70</td>
<td>- 0.04</td>
</tr>
</tbody>
</table>

|                                |         |             |            |
| **Finishing period (30 pigs/group)** |         |             |            |
| Initial BW (kg)                | 25.97   | 27.33       | 1.36       |
| Final BW (kg)                  | 90.00   | 95.67       | 5.67       |
| Total growth (kg)              | 64.03   | 68.34       | 4.31       |
| Daily weight gain (g)          | 781     | 814         | 33         |
| FCR                            | 2,978   | 2,891       | - 0.087    |
| Feed cost/kg growth (€)        | 0.71    | 0.63        | - 0.08     |

Source: Trial report, SCC Degollado, Mexico (2010); Trial 311
Benefits in Finishing Pigs

- Improved feed intake
- Improved weight gain
- Better feed efficiency
- Reduce mortality
- Better uniformity
- High cost effectiveness (ROI)
Improving Animal Performance & Economical Results

Finishing Pigs

Naturally ahead
Application in Pigs

- **Farrowing**
  - 6-8 kg BW
  - Digestarom® Start 300 g/t in prestarer

- **Weaning**
  - 12-15 kg BW
  - Digestarom® Grow 300 g/t in grower feed

- **Finishing**
  - 26-28 kg BW
  - Digestarom® Finish 150 g/t in grower/finisher feed

- **Slaughter**

**Nitrogen Content**
- 6-8 kg BW: 12-15 kg BW: 26-28 kg BW

**Application Details**
- Digestarom® Start: 300 g/t in prestarer
- Digestarom® Grow: 300 g/t in grower feed
- Digestarom® Finish: 150 g/t in grower/finisher feed
**Scientific trial with growing-finishing pigs**
Zootechnical results

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Digestarom®</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of animals</td>
<td>120</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>Initial weight (kg)</td>
<td>8.65</td>
<td>8.66</td>
<td>+0.01</td>
</tr>
<tr>
<td>Final weight (kg)</td>
<td>100.16</td>
<td>102.34</td>
<td>+2.18</td>
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<tr>
<td>Total growth (kg)</td>
<td>91.51</td>
<td>93.68</td>
<td>+2.17</td>
</tr>
<tr>
<td>Daily weight gain (g)</td>
<td>694</td>
<td>710</td>
<td>+16</td>
</tr>
<tr>
<td>Daily feed intake (g)</td>
<td>1,857</td>
<td>1,821</td>
<td>-36</td>
</tr>
<tr>
<td>FCR</td>
<td>2.681</td>
<td>2.545</td>
<td>-0.136</td>
</tr>
</tbody>
</table>

Source: Khon Kaen University, Thailand 2009 (Trial 288 a)
### Scientific trial with growing-finishing pigs

Carcass quality

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Digestarom®</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of animals</td>
<td>12/12</td>
<td>12/12</td>
</tr>
<tr>
<td>Carcass length (cm)</td>
<td>86.70</td>
<td>87.33</td>
</tr>
<tr>
<td>Dressing percentage (%)</td>
<td>76.91</td>
<td>77.62</td>
</tr>
<tr>
<td>Loin eye area (cm²)</td>
<td>36.19</td>
<td>36.48</td>
</tr>
<tr>
<td>Lean meat (%)</td>
<td>55.48</td>
<td>56.73</td>
</tr>
<tr>
<td>Color score*</td>
<td>1.634</td>
<td>1.673</td>
</tr>
</tbody>
</table>

*Color score: 1.0 = normal red +, 1.5 = normal red + +, 2.0 = normal red + + +

Source: Khon Kaen University, Thailand 2009 (Trial 288 a)
Improved Finishing Performance

Optimizing performance: DWG, FCR, efficiency

Daily weight gain

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Digestarom®</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>102%</td>
<td></td>
</tr>
</tbody>
</table>

FCR

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
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</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>95%</td>
<td></td>
</tr>
</tbody>
</table>

Feed cost/kg growth

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Digestarom®</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>96%</td>
<td></td>
</tr>
</tbody>
</table>

Source: Khon Kaen University, Thailand 2009 (Trial 288 a)
### Improved Economic Return

#### Change in production costs (PC) per kg carcass weight (CW) when using Digestarom® in finishers

<table>
<thead>
<tr>
<th></th>
<th>Unit</th>
<th>Change in PC (Cent/kg CW)</th>
<th>Trial 1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Effect of Digestarom®</td>
</tr>
<tr>
<td>Daily weight gain</td>
<td>+100g</td>
<td>-5.6</td>
<td>+51g</td>
</tr>
<tr>
<td>Feed conversion</td>
<td>-0.1</td>
<td>-2.3</td>
<td>-0.08</td>
</tr>
<tr>
<td>Lean meat</td>
<td>+1.0%</td>
<td>-2.1</td>
<td>+0.4%</td>
</tr>
<tr>
<td>Finishing time (days)</td>
<td></td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Mortality</td>
<td>-1.0%</td>
<td>-1.2</td>
<td>-3.79%</td>
</tr>
<tr>
<td>Total saving in PC/kg CW (Cent)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Assessed according to: Matthes (IfT Dummerstorff), 2009
### Improved Economic Return

*Change in production costs (PC) per kg carcass weight (CW) when using Digestarom® in finishers*

<table>
<thead>
<tr>
<th></th>
<th>Unit</th>
<th>Change in PC (Cent/kg CW)</th>
<th>Trial 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Effect of Digestarom®</td>
</tr>
<tr>
<td>Daily weight gain</td>
<td>+100g</td>
<td>-5.6</td>
<td>+27g</td>
</tr>
<tr>
<td>Feed conversion</td>
<td>-0.1</td>
<td>-2.3</td>
<td>-0.23</td>
</tr>
<tr>
<td>Lean meat</td>
<td>+1.0%</td>
<td>-2.1</td>
<td>-</td>
</tr>
<tr>
<td>Finishing time (days)</td>
<td>-</td>
<td>-</td>
<td>-2</td>
</tr>
<tr>
<td>Mortality</td>
<td>-1.0%</td>
<td>-1.2</td>
<td>-</td>
</tr>
<tr>
<td>Total saving in PC/kg CW (Cent)</td>
<td></td>
<td></td>
<td>-6.80</td>
</tr>
</tbody>
</table>

Assessed according to: Matthes (IfT Dummerstorf), 2009
### Improved Economic Return

*Change in production costs (PC) per kg carcass weight (CW) when using Digestarom® in finishers*

<table>
<thead>
<tr>
<th></th>
<th>Unit</th>
<th>Change in PC (Cent/kg CW)</th>
<th>Trial 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Effect of Digestarom®</td>
</tr>
<tr>
<td>Daily weight gain</td>
<td>+100g</td>
<td>-5.6</td>
<td>+26g</td>
</tr>
<tr>
<td>Feed conversion</td>
<td>-0.1</td>
<td>-2.3</td>
<td>-0.20</td>
</tr>
<tr>
<td>Lean meat</td>
<td>+1.0%</td>
<td>-2.1</td>
<td>-</td>
</tr>
<tr>
<td>Finishing time (days)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Mortality</td>
<td>-1.0%</td>
<td>-1.2</td>
<td>-1.25%</td>
</tr>
<tr>
<td>Total saving in PC/kg CW (Cent)</td>
<td></td>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>
### Improved Economic Return

*Change in production costs (PC) per kg carcass weight (CW) when using Digestarom® in finishers*

<table>
<thead>
<tr>
<th></th>
<th>Unit</th>
<th>Change in PC (Cent/kg CW)</th>
<th><strong>Trial 4</strong></th>
<th>Effect of Digestarom®</th>
<th>Change in PC (Cent/kg CW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily weight gain</td>
<td>+100g</td>
<td>-5.6</td>
<td>-</td>
<td>+27g</td>
<td>-1.51</td>
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<tr>
<td>Feed conversion</td>
<td>-0.1</td>
<td>-2.3</td>
<td>-</td>
<td>-0.07</td>
<td>-1.61</td>
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<tr>
<td>Lean meat</td>
<td>+1.0%</td>
<td>-2.1</td>
<td>-</td>
<td>+0.27%</td>
<td>-0.57</td>
</tr>
<tr>
<td>Finishing time (days)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-2</td>
<td>-</td>
</tr>
<tr>
<td>Mortality</td>
<td>-1.0%</td>
<td>-1.2</td>
<td>-</td>
<td>-2.1</td>
<td>-1.2</td>
</tr>
<tr>
<td>Total saving in PC/kg CW (Cent)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-3.69</td>
</tr>
</tbody>
</table>

Assessed according to: Matthes (IfT Dummerstorf), 2009
### Improved Economic Return

**Change in gross margin (€/animal) when using Digestarom® in finishers**

<table>
<thead>
<tr>
<th></th>
<th>Unit</th>
<th>Change in GM/unit (€/pig)</th>
<th><strong>Trial 1</strong></th>
<th><strong>Trial 2</strong></th>
<th><strong>Trial 3</strong></th>
<th><strong>Trial 4</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Daily weight gain</strong></td>
<td>+100g</td>
<td>+2.0</td>
<td>+51g</td>
<td>+1.02</td>
<td>+26g</td>
<td>+27g</td>
</tr>
<tr>
<td><strong>Feed conversion</strong></td>
<td>-0.1</td>
<td>+1.4</td>
<td>-0.08</td>
<td>+1.12</td>
<td>-0.20</td>
<td>+2.80</td>
</tr>
<tr>
<td><strong>Lean meat</strong></td>
<td>+1.0%</td>
<td>+2.5</td>
<td>+0.4%</td>
<td>+1.00</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Finishing time (days)</strong></td>
<td>-1</td>
<td>+0.2</td>
<td>-</td>
<td>-</td>
<td>+2</td>
<td>-0.40</td>
</tr>
<tr>
<td><strong>Mortality</strong></td>
<td>-3.79%</td>
<td>-</td>
<td>-3.14</td>
<td>+3.36</td>
<td>+3.32</td>
<td>+2.60</td>
</tr>
</tbody>
</table>

**Total gross margin change (€/pig)**

Trial 1: Germany (264 pigs); Trial 2: Germany (280 pigs); Trial 3: Germany (480 pigs); Trial 4: Austria (53 pigs)

Assessed according to: Center of Husbandry and Technics Iden (Germany), 2005
# Improved Performance

**Commercial trial in a 10,000-places finisher unit**

Body weight & weight gain (Starter & grower period)

**Feeding:** Crops produced on the farm + Starter, Finisher supplements

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Digestarom®</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of animals (Initial/Final)</td>
<td>102/101</td>
<td>101/99</td>
<td></td>
</tr>
<tr>
<td>Initial weight (kg)</td>
<td>32.35</td>
<td>32.38</td>
<td>0.03</td>
</tr>
<tr>
<td>2nd weighing (kg)</td>
<td>83.91</td>
<td>90.06</td>
<td>6.15</td>
</tr>
<tr>
<td>Total gain (kg)</td>
<td>51.56</td>
<td>57.68</td>
<td>5.78</td>
</tr>
<tr>
<td>Daily weight gain (g)</td>
<td>633</td>
<td>704</td>
<td>71</td>
</tr>
</tbody>
</table>

Source: Preliminary field trial data, Germany, 2011/2012
### Improved Economic Return

**Commercial trial in a 10,000-places finisher unit**

Economic calculation

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Digestarom®</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of pigs slaughtered</td>
<td>439</td>
<td>400</td>
</tr>
<tr>
<td>Occupation time of stable (days)</td>
<td>135</td>
<td>124</td>
</tr>
<tr>
<td>Total carcass weight produced (kg)</td>
<td>41,187</td>
<td>37,047</td>
</tr>
<tr>
<td>Carcass weight/pig (kg)</td>
<td>93.8</td>
<td>92.6</td>
</tr>
<tr>
<td>Cycles/year (incl. 5 service days/cycle)</td>
<td>2.61</td>
<td>2.83</td>
</tr>
<tr>
<td>Total carcass weight /place/year (kg)</td>
<td>244.6</td>
<td>262.1</td>
</tr>
<tr>
<td>Income/place/year (1.60 €/kg CW)</td>
<td>391.4</td>
<td>419.3</td>
</tr>
<tr>
<td>Number of places</td>
<td>1,000</td>
<td>1,000</td>
</tr>
<tr>
<td>Income per 1,000 places/year (€)</td>
<td>391,363</td>
<td>419,295</td>
</tr>
<tr>
<td>Digestarom® costs per 1,000 places/year (€)</td>
<td>1,613</td>
<td>+26,320</td>
</tr>
<tr>
<td>Difference in income per 1,000 places/year (€)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Preliminary field trial data, Germany, 2011/2012
Increased Lean Meat Yield

Commercial trial with 5732 finishing pigs
Trial included in total 10 farms (Austria)
Benefits in Finishing Pigs

- Improved weight gain
- Better feed efficiency
- Less days to market
- Enhanced lean meat yield
- High cost effectiveness (ROI)
Digestarom® Routes of Application

**Feed**
- All solid Digestarom® products

**Drinking water**
- Digestarom® P.E.P. sol

**Direct**
- Digestarom® P.E.P. liquid
Thank you for your attention