Faba beans to pigs-
Properties and possibilities of different cultivars

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Background

• Urgent need to decrease the dependence of imported protein sources in animal production within Europe.

• Faba beans- potential crop that can be used to a higher extent. Cultivation is increasing.

• CP ~30%, low methionine, contains ANS- tannins, vicine/convicine
Background

- White- and colour-flowered cultivars
- White-flowered cultivar - no or very low tannin content - recommended to monogastrics
- Variation between colour-flowered cultivars in tannin content
- Might some colour-flowered cultivars be possible to use in pig feeds?
Project plan

- Lab analyses of cultivar-specific samples
- Select a promising and an ‘unpromising’ coloured cultivar, compare to a white-flowered cultivar and a soybean control
- Feeding trial weaner pigs
Materials and methods

- Extensive lab study
- 11 colour- and 5 white-flowered cultivars, 3 cultivation areas
- Analysed for DM, ash, CP, amino acids, condensed tannins (HPLC-FLP; procyanidin and prodelphinidins), and enzymatic digestibility *in vitro* (Boisen et al., 1991)
Major results lab study

<table>
<thead>
<tr>
<th></th>
<th>White-flowered</th>
<th>Colour-flowered</th>
</tr>
</thead>
<tbody>
<tr>
<td>CP content % DM</td>
<td>31.0 (29-34)</td>
<td>31.1 (30-33)</td>
</tr>
<tr>
<td>Condensed tannins (CT) g/kg</td>
<td>0.16</td>
<td>6.32* (5.7-7.4)</td>
</tr>
<tr>
<td>Digestibility OM%</td>
<td>77 (74-78)*</td>
<td>70 (66-72)*</td>
</tr>
<tr>
<td>Digestibility CP%</td>
<td>98 (97-98)</td>
<td>93 (92-94)*</td>
</tr>
</tbody>
</table>

* denotes significance.
Selection of cultivars

• White-flowered:
  *Gloria* (% of DM)
  - CP: 34.4, dOM: 67.1 dCP: 33.6, CT: 0

• Colour-flowered:
  *Julia* (promising; % of DM)
  - CP: 32.6, dOM: 62.9; dCP: 30.6; CT: 5.7 g/kg
  *Fuego* (unpromising; % of DM)
  - CP: 30.4, dOM: 59; dCP: 28.4; CT: 6.4 g/kg
Pig experiment - diets

- Control
- Gloria- 20%
- Julia- 10%
- Julia- 20%
- Fuego- 10%
- Fuego- 20%

- cereals, soybean meal and potato protein substituted to the different cultivars of faba beans

- Optimized to be similar in energy (9.3 MJ NE), sidCP (12%), sid met (2.9 g/kg), sid lys (9.7 g/kg)
Pig experiment-pigs

- 300 weaner pigs (Hampshire × Yorkshire)
- 5 pens per treatment and 10 pigs/pen
- Split litter design with 5 batches of pigs
- 5-9 weeks of age
- Free access to pelleted diets in feed hoppers
## Results

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Gloria</th>
<th>Julia10</th>
<th>Julia20</th>
<th>Fuego10</th>
<th>Fuego20</th>
<th>SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>BW 7 w kg/pig</td>
<td>15.8</td>
<td>16.3</td>
<td>16.2</td>
<td>16.1</td>
<td>15.8</td>
<td>15.8</td>
<td>0.80</td>
</tr>
<tr>
<td>BW 9 w kg/pig</td>
<td>25.1</td>
<td>25.8</td>
<td>26.4</td>
<td>26.5</td>
<td>25.6</td>
<td>25.2</td>
<td>0.57</td>
</tr>
<tr>
<td>ADG g/ pig and day</td>
<td>501</td>
<td>520</td>
<td>549</td>
<td>542</td>
<td>516</td>
<td>507</td>
<td>13.1</td>
</tr>
<tr>
<td>FI g/ pig and day</td>
<td>834</td>
<td>843</td>
<td>902</td>
<td>851</td>
<td>842</td>
<td>808</td>
<td>19.8</td>
</tr>
<tr>
<td>FCR (kg feed/ kg growth)</td>
<td>1.67&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.61&lt;sup&gt;ab&lt;/sup&gt;</td>
<td>1.65&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.55&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.63&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.61&lt;sup&gt;ab&lt;/sup&gt;</td>
<td>0.023</td>
</tr>
</tbody>
</table>
Discussion

- CT (5.7-7.4 g/kg) comparable to Jezierny et al. (2010) but lower than Makkar et al. (1997) 26.2 g/kg
- Lower digestibility in colour than white-flowered cultivars (Makkar et al., 1997; Jansman et al., 1993)
- Lower protein digestibility but maintained growth performance in growers fed diets with ~0.6 g/kg tannins (Flis et al., 1999)
- 25% inclusion of colour-flowered faba beans, improved growth rate and decreased occurrence of weaning diarrhea (Møller et al., 2014).
Conclusion

- 20% inclusion of faba beans, independently of cultivar is possible in a weaner pig diets, when the diets are supplemented with synthetic amino acids.
Acknowledgement

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Thank you for your attention!

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