Nutritive value of four tropical forage legume hays fed to pigs in the Democratic Republic of Congo

Kambashi$^{1,2}$ B., Boudry$^1$ C., Picron$^1$ P., Kiatoko$^2$ H., Théwis$^1$ A., Bindelle$^1$ J.

$^1$ University of Liège, Gembloux Agro-Bio Tech, Belgium
$^2$ University of Kinshasa, Faculty of Agro-Livestock Sciences, Democratic Republic of Congo
Communication plan

- Context
- Aim of the research
- Research strategy
- Methods
- Results
- Conclusion
1. Context

- Pigs in DRC:
  - Pigs are raised by smallholders (96%)
  - Semi-intensive system
  - Small herd size (3 to 5 sows)
  - Pig breeding is:
    - main source of cash
    - improving livelihood
    - saving strategy
How pigs are fed?

- **Pig feeds**
  - Commercial concentrate diets (4%)
  - "Home-made" diets (96%)

- **Non forages (11%)**
- **Forages (89%)**

- **Concentrate (> 30 ingredients)**
  - Wheat bran 80%
  - Palm kernel meal 73%
  - Brewers grain 50%
  - Corn 38%
  - ...

- **Forages (> 40 plants)**
  - *Manihot esculenta* leaves 32%
  - *Ipomoea batatas* leaves 29%
  - Leafy vegetables 25%
  - *Eichornia crassipes* 23%
  - *Psophocarpus scandens* 22%
  - ...

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Forages used

- Forage plant material
  - Leaves (e.g. *Musa* spp.)
  - Leaves and stems (e.g. *Ipomoea batatas*)
  - Whole plant (e.g. *Eichornia crassipes*)

- Origin
  - Non-edible or unsold edible fruits and vegetables
  - Weeds (in the forests, banks of rivers)
  - Fields fallow (weeds or previous cropping plants)
  - Aquatic plants.
Usefulness?

- Advantages of forages
  - Low cost
  - Non-competitive with human food
  - High levels of protein, minerals and vitamins
  - Integrated in crop-animal production systems
  - Nutrient cycles at the farm level and improved sustainability

- Drawbacks of forages
  - Low digestibility owing to their fibre content
  - Anti-nutritive compounds
  - Lack of preservation methods
2. Aim of the research

- Help smallholders in better selecting the forage plants to feed their pigs

- Identification of interesting forages
  - High protein content
  - High nutritive value

- Determine the right inclusion rate of these forages in pig diets

- Assess the performance of pigs fed these forages
3. Research strategy

- **Survey (320)**
- **Collection of Forages samples**
- **Chemical composition *in vitro* digestibility (20 species)**
- **Voluntary intake and *in vivo* digestibility (4 species)**

Effect of forages on growth performance and carcass trait

Social, economical and environmental consequences of feeding pigs with forage

How to preserve forages and improve the nutritional value?
4. Methods

Digestibility trial

- Cross-over with 36 Large White barrows
- Diet
  - Tropical forage meals (whole-plant hays)
    - *Vigna unguiculata*
    - *Psophocarpus scandens*
    - *Pueraria phaseoloides*
    - *Stylosanthes guianensis*
  - Commercial diet used as basal diet (corn-soybean meal)
  - 125 or 250g/kg DM of the basal diet were replaced by one of the tropical forage meals (TFM)
5. Results

- **Digestibility**

<table>
<thead>
<tr>
<th>Item</th>
<th>Basal diet</th>
<th>Psopho</th>
<th>Pueraria</th>
<th>Stylo</th>
<th>Vigna</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>125</td>
<td>250</td>
<td>125</td>
<td>250</td>
<td>125</td>
</tr>
<tr>
<td>Level</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dry matter</td>
<td>0.76</td>
<td>0.71^a</td>
<td>0.65^b</td>
<td>0.70^a</td>
<td>0.61^c</td>
</tr>
<tr>
<td>Crude protein</td>
<td>0.80</td>
<td>0.76^a</td>
<td>0.70^cd</td>
<td>0.75^ab</td>
<td>0.68^d</td>
</tr>
<tr>
<td>NDF</td>
<td>0.54</td>
<td>0.49^abc</td>
<td>0.43^d</td>
<td>0.47^bc</td>
<td>0.41^d</td>
</tr>
<tr>
<td>Energy</td>
<td>0.75</td>
<td>0.70^a</td>
<td>0.64^bc</td>
<td>0.69^a</td>
<td>0.61^c</td>
</tr>
<tr>
<td>Nitrogen Retained</td>
<td>0.58</td>
<td>0.49^ab</td>
<td>0.33^c</td>
<td>0.41^bc</td>
<td>0.31^c</td>
</tr>
<tr>
<td>DE (Kcal/kg DM)</td>
<td>3303</td>
<td>3250^a</td>
<td>2810^b</td>
<td>2941^ab</td>
<td>2727^b</td>
</tr>
</tbody>
</table>

- All 4 forage species decreased linearly the total tract apparent digestibility (TTAD)
- Protein digestibility seems less affected than energy by forage inclusion
- But N-retention was higher for *Stylosanthes guianensis* hay
- Low digestibility for *Pueraria phaseoloides*
6. Conclusion

- Under smallholder condition, TFM can potentially be used as protein source for pig.
- Due to low digestibility, the inclusion rate of TFM in the diet should not exceed 25%.
- The use of *Pueraria phaseoloides* should be discouraged in pig.
- Further work is required to:
  - confirm and understand the superior N value of stylo hays.
  - assess the long term impact of anti-nutrient compounds on performances.
Thank you for your attention

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We like eating forages

Corresponding author: bkambashi@gmail.com