Growth, performance, and carcass quality of hazelnut supplemented finishing pigs

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Hazelnuts…

• Perennial shrub
• Cultivated germplasm available
• https://www.midwesthazelnuts.org/
• Processing hazelnut remains a challenge for Midwest growers
• Undersized (<10 mm)
• Incomplete separation
<table>
<thead>
<tr>
<th></th>
<th>&lt; 10 mm, whole nut</th>
<th>Kernels</th>
<th>Whole soybean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crude Protein, % DM</td>
<td>7.56</td>
<td>18.42</td>
<td>39.60</td>
</tr>
<tr>
<td>Lysine, % DM</td>
<td>0.24</td>
<td>0.52</td>
<td>6.20</td>
</tr>
<tr>
<td>Methionine, % DM</td>
<td>0.10</td>
<td>0.23</td>
<td>1.40</td>
</tr>
<tr>
<td>Crude Fat, % DM</td>
<td>21.11</td>
<td>61.22</td>
<td>21.00</td>
</tr>
<tr>
<td>Linoleic, % of total fatty acids</td>
<td>3.58</td>
<td>9.40</td>
<td>51.00</td>
</tr>
<tr>
<td>Oleic, % of total fatty acids</td>
<td>14.87</td>
<td>45.36</td>
<td>23.00</td>
</tr>
</tbody>
</table>
## Nutrient Profile of Hazelnut products

<table>
<thead>
<tr>
<th>Nutrient, % as fed</th>
<th>&lt; 10 mm whole nut</th>
<th>Corn grain</th>
<th>Soybean meal</th>
<th>Hazelnut Kernels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>6.02</td>
<td>11.00</td>
<td>10.00</td>
<td>3.88</td>
</tr>
<tr>
<td>Crude Protein</td>
<td>7.11</td>
<td>8.30</td>
<td>47.50</td>
<td>17.71</td>
</tr>
<tr>
<td>Crude Fat</td>
<td>19.84</td>
<td>3.90</td>
<td>3.00</td>
<td>58.85</td>
</tr>
<tr>
<td>Crude Fiber</td>
<td>46.48</td>
<td>2.30</td>
<td>3.40</td>
<td>4.63</td>
</tr>
</tbody>
</table>
Hazelnut Fed Pigs

- 36 barrows, 6 pens of 6
- Start weight 135 lb
- All pigs marketed 69 days later
- Corn soybean meal ± 10% in shell hazelnut (<10 mm)
Preparing Hazelnuts

- Small scale roller mill
- 2 hp… 60 bu barley/hr
- Designed for homebrewers
Trial and error… 15 min = 200 lb

- 2 passes
- 1772 microns
Feed particle size

- Impacts digestibility of pig feed
- Milled hazelnuts = 1772 µm
- Corn-Soy Diet = 800 µm
- Corn-Soy + 10% Hazelnut = 991 µm
• Weigh every 4 weeks
• Digital ultrasound at start and end
• Carcasses evaluated
• 2 chops/pig collected
# Growth and Performance

## Summer Trial (6/4-8/12)

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>10% Hazelnut</th>
<th>SEM</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start wt, lb</td>
<td>135.6</td>
<td>135.0</td>
<td>1.7</td>
<td>0.8238</td>
</tr>
<tr>
<td>End wt, lb</td>
<td>281.2</td>
<td>275.2</td>
<td>5.6</td>
<td>0.4942</td>
</tr>
<tr>
<td>ADG, lb/d</td>
<td>2.11</td>
<td>2.02</td>
<td>0.07</td>
<td>0.4547</td>
</tr>
<tr>
<td>ADFI, lb/d</td>
<td>7.57</td>
<td>7.83</td>
<td>0.22</td>
<td>0.4633</td>
</tr>
<tr>
<td>G:F</td>
<td>0.278</td>
<td>0.260</td>
<td>0.005</td>
<td>0.0661</td>
</tr>
</tbody>
</table>
Carcass and Meat Quality

- Carcasses evaluated at harvest
- 2 chops/pig collected
- Analysis on-going
- Preliminary results from Summer Trial
Carcass and meat quality (SUMMER)

- No difference in hot carcass, % lean, marbling, loin eye area
- No difference in color, tenderness, water holding capacity
- No difference in taste panel results
Fatty Acid Profile was impacted (SUMMER)

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<th>SEM</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palmitic (16:0)</td>
<td>25.86</td>
<td>24.60</td>
<td>0.32</td>
<td>0.0194</td>
</tr>
<tr>
<td>Oleic (18:1)</td>
<td>40.32</td>
<td>42.71</td>
<td>0.50</td>
<td>0.0294</td>
</tr>
</tbody>
</table>
Summary

• Growth and performance similar
• Oleic acid concentration was ~6% higher when pigs fed 10% in-shell hazelnuts (summer 2019 data)
• No discernable quality differences detected
Stay Tuned…

• Trial 1 complete
• Trial 2 feeding trial complete, analysis continues
• Complete results available summer 2020
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Thank you to Collaborators

• Krista Eiseman, UW-Platteville
• Chris Beedle, Iowa State University
• Jason Fischbach, UW-Extension
• Brad Niemcek, American Hazelnut Company
• Jim Magolski, Niman Ranch
Acorn Fed Pigs

- Southern Spain
- 100% Jamon Iberico de bellota
- Ham from purebred Iberian
- pigs fed acorns
Production Basics

• 1.5–2 years birth to harvest
• 3 year-long traditional curing process

• Iberian Ham = pig from Spain
• Labeling matters….
These pigs are not the same!
Traditional Iberian

• Long snout
• Long legs
• Thin muscle
• "walking olive tree"
Acorns… available for 3-4 months

• Iberian pigs evolved to grow lots of fat when acorns present

• Slow growing (but survive) until acorns return
Acorn Fed Pigs in Spain…

• 10-12 months of corn-soy until 200 lb
• Put onto acorn pasture for 3-4 months
• 7.4-14.8 acres/pig
• Eat about 10 lb acorn/d
• Grow at about 2 lb/d
The ham is amazing!

- $48/lb online
Acorn vs Hazelnut…

- Both are rich in oleic acid
- Potentially unique pork flavor profile
- The hull is a challenge