Are Millet and Sorghum Good Alternatives to Maize in Layer’s Feeds in Niger, West Africa?

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Central-Est
Outlines

- Introduction
- Objective
- Experimental Procedure
- Results & Discussion
- Conclusion
**Introduction**

- Corn substitution by sorghum in poultry diets has been extensively studied in India, US, and West Africa (Issa et al. 2010; Parthasarathy et al.; 2005);

- Increasing trend and a high variation of the prices of cereals Ravindran (2013).

- In Niger, locally produced millet and sorghum are generally less expensive than imported corn. However, *Pearl millet* the first cereal grain produced and used primarily as food in Niger, is fewer tested as poultry feed ingredient.

- Sorghum and millet could play an important role in formulating diets for animals such as poultry.
Objective

To determine the feeding value of diets made with imported corn, and local sorghum and pearl millet varieties.
One hundred and twenty (120) 19-wk pullets (5 trts, 4 pens/trt and 6 birds/pen)

Trts:
- Commercial yellow Corn
- Corn 50% + Sepon 82 sorghum 50%
- Corn 50% + pearl Millet HKP 50%
- Pearl Millet HKP
- Sorghum Sepon 82

Cereals were coarsely grounded
Experimental Procedures

(continuous)

- The control diet was corn-based with fishmeal and peanut cake used as the primary protein supplements.
- The control was formulated on the recommendations for all nutrient concentrations as suggested in the 1994 NRC for poultry.
- Diets were formulated to 0.6 for Lys, 0.3 for Met and 2783 Mcal/kg for ME (NRC 1994)
- Sorghum and millet were used to replace the corn on a wt/wt basis
Ingredients samples were collected and analysed through proximate analysis.

Birds were bedded in a naturally-ventilated house with humidity at 24.6 ± 0.4%, wind speed at 1.6 ± 0.4m/s, and temperature at 18 ± 3°C in the morning and 29 ± 3°C in the afternoon.

Birds were vaccinated for ND, Gumboro and egg syndrome disease.
Experimental Procedures

(continuous)

- Performance response criteria were egg production rate (EPR), average daily feed intake (ADFI), egg weight (EWt), feed conversion (FC) as g of feed/dozen eggs), feed cost (FCt), and egg yolk color (EYC) measured with Roche color score.

- Collected data were analysed as a randomized complete block design using the Proc Mixed procedure of R.
## Ingredient Analyses

<table>
<thead>
<tr>
<th>Item</th>
<th>Corn</th>
<th>Sorghum Sepon 82</th>
<th>HKP-Pearl millet</th>
</tr>
</thead>
<tbody>
<tr>
<td>DM, %</td>
<td>92.1</td>
<td>92.1</td>
<td>92.2</td>
</tr>
<tr>
<td>CP, %</td>
<td>10.0</td>
<td>12.3</td>
<td>11.4</td>
</tr>
<tr>
<td>EE, %</td>
<td>5.0</td>
<td>3.1</td>
<td>5.3</td>
</tr>
<tr>
<td>CF, %</td>
<td>2.3</td>
<td>2.0</td>
<td>2.1</td>
</tr>
<tr>
<td>Ash, %</td>
<td>1.2</td>
<td>2.1</td>
<td>2.2</td>
</tr>
<tr>
<td>NFE, %</td>
<td>73.6</td>
<td>72.6</td>
<td>71.2</td>
</tr>
</tbody>
</table>
Harco layers egg production and quality performances when fed corn, sorghum or millet at Maradi, Niger.

<table>
<thead>
<tr>
<th>Item</th>
<th>Corn</th>
<th>CS-50</th>
<th>CMI-50</th>
<th>Millet</th>
<th>Sorghum</th>
<th>ES</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pullet initial weight, g</td>
<td>1,059</td>
<td>1,012</td>
<td>1,061</td>
<td>1,062</td>
<td>1,058</td>
<td>28</td>
<td>$P &gt; 0.57$</td>
</tr>
<tr>
<td>Laying rate, egg/hen/d</td>
<td>83.8</td>
<td>85.5</td>
<td>84.4</td>
<td>84.2</td>
<td>84.2</td>
<td>1.8</td>
<td>$P &gt; 0.78$</td>
</tr>
<tr>
<td>Feed intake, g/hen/d</td>
<td>112&lt;sup&gt;b&lt;/sup&gt;</td>
<td>105&lt;sup&gt;a&lt;/sup&gt;</td>
<td>106&lt;sup&gt;a&lt;/sup&gt;</td>
<td>105&lt;sup&gt;a&lt;/sup&gt;</td>
<td>109&lt;sup&gt;b&lt;/sup&gt;</td>
<td>2</td>
<td>$P &lt; 0.02$</td>
</tr>
<tr>
<td>Egg weight, g</td>
<td>49&lt;sup&gt;b&lt;/sup&gt;</td>
<td>48&lt;sup&gt;a&lt;/sup&gt;</td>
<td>48&lt;sup&gt;a&lt;/sup&gt;</td>
<td>50&lt;sup&gt;b&lt;/sup&gt;</td>
<td>48&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1</td>
<td>$P &lt; 0.01$</td>
</tr>
<tr>
<td>FC, g of feed/12 eggs)</td>
<td>1628&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1511&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1550&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1582&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1639&lt;sup&gt;b&lt;/sup&gt;</td>
<td>50</td>
<td>$P &lt; 0.03$</td>
</tr>
<tr>
<td>F. cost/12 eggs, $</td>
<td>0.80&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.74&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.73&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.75&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.78&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.02</td>
<td>$P &lt; 0.03$</td>
</tr>
<tr>
<td>EYC, Roche Color Unit</td>
<td>8.2&lt;sup&gt;b&lt;/sup&gt;</td>
<td>8.0&lt;sup&gt;b&lt;/sup&gt;</td>
<td>7.8&lt;sup&gt;b&lt;/sup&gt;</td>
<td>3.8&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.3&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.4</td>
<td>$P &lt; 0.01$</td>
</tr>
</tbody>
</table>
Cereal-based diets and Yolk Color

- Corn
- 50% Corn + 50% millet
- 50% Corn + 50% sorghum
- Millet
- Sorghum
Discussion

The results of this study were consistent with previous reports and confirm:

- Kansas State University research results which have demonstrated the nutritional merits of sorghum and established the essentiality of proper milling when using sorghum-based diets for the production of poultry, (Hancock, 2000; Issa et al., 2009).

- College of Veterinary Science Sri Venkateshwara University result: Sorghum can replace entire maize in poultry diets for broilers and layers without affecting the performance except that consumer preference of skin and yolk pigmentation, Rajashekher 2005.

- Unlike pearl millet, increasing levels of replacement of corn by sorghum did not affect bird performance negatively. Only, the yolk color is affected by sorghum and millet (almost pale), Filardi 2005.
Conclusion

- Layers fed on corn versus those fed on 50% corn + 50% sorghum, or 50% corn + 50% millet, or sorghum or millet had similar egg production rate.
- In addition birds fed corn, 50% corn + 50% sorghum and 50% corn + 50% millet had the best egg pigmentation.
- So, higher yielding millet and sorghum can be used for commercial production in more favourable environments and local production of pearl millet and sorghum can address the high import of corn.
- Therefore it is recommended that in Niger, poultry producers could replace corn up to 50% by millet or sorghum in layer diets.
ACKNOWLEDGEMENTS

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Thanks

Questions