INTRODUCTION:
• Ground, dry shelled corn and grains produced by feed mills is not uniform in particle size characteristics nor consistent relative to animal performance
• Ground, dry corn grain geometric mean particle size (GMPS, Firkins et al., 2001; Ferrareto et al., 2013) has been related to ruminal and total tract starch digestion by dairy cattle
• The standard deviation around the mean is also generally thought to impact to dairy cattle digestion and performance
• GMPS (micron) has been related to rumen digestion (Firkins et al., 2001) but little research has been completed evaluating commercially ground corn or corn grains of less than 700 micron GMPS
• Some feed mills are now capable of routinely grinding dry corn to yield GMPS of less than 400 microns
• Reduced particle size to below 806 micron has been shown to offer an advantage in peak absolute gas production but not directly related to fermentation potential (Hoffman et al., 2011)

OBJECTIVE:
The objective of our work was to determine if GMPS or SA were better in relation to rumen in situ starch disappearance (%SD) for commercially ground, dry shelled corn.

RESULTS AND DISCUSSION:
• Commercial ground corn samples vary to very substantially with Coefficient of Variations ranging from 4.52 to 6.26 depending on parameter of interest (Table 1)
• Raw starch disappearance means are presented in Figure 1
  • Final statistical model fit, the model exhibited an adjusted R² = 0.86 and standard error of 10.3
  • These observations suggest surface area is better related to rumen starch disappearance than geometric mean particle size

Table 1: Commercial ground corn measure population descriptive statistics.

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>MEAN</th>
<th>STANDARD DEVIATION</th>
<th>COEFFICIENT OF VARIATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starch, % of DM</td>
<td>70.6</td>
<td>3.2</td>
<td>4.53</td>
</tr>
<tr>
<td>GMPS, micron</td>
<td>715</td>
<td>233</td>
<td>32.59</td>
</tr>
<tr>
<td>Surface area, cm²/g</td>
<td>92.7</td>
<td>20.8</td>
<td>22.44</td>
</tr>
<tr>
<td>In situ starch, 0h, % of starch</td>
<td>19.8</td>
<td>12.4</td>
<td>62.63</td>
</tr>
<tr>
<td>In situ starch, 7h, % of starch</td>
<td>68.7</td>
<td>10.6</td>
<td>15.43</td>
</tr>
</tbody>
</table>

Table 1: Commercial ground corn measure population descriptive statistics.

• Following final statistical model fit, the model exhibited an adjusted R² = 0.86 and standard error of 10.3
• The parameter estimate for surface area in relation to is SD was 0.20 with a standard error of 10.3
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• Time and starch content showed a trend towards an interaction (P<0.06)
• 0h tended to increase in SD with increased starch to a greater extent than 7h
• The parameter estimate for surface area in relation to SD was 0.20 with a standard error of 10.3
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CONCLUSIONS:
• These observations suggest surface area is better related to rumen starch disappearance than geometric mean particle size
• Surface area results and discussion, separated for 0h or 7h measures, are presented in Figure 2

REFERENCES: