GRAIN CHOICE FOR THOROUGHBREDs: INDUSTRY PRACTICE

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Choosing ‘safe’, digestible grains for horses is difficult as starch content and digestibility can vary greatly between and within grain species. Horses have evolved on a diet of forage and are thus not well equipped to digest starch in the small intestine (Budiansky 1998). When grains with poor starch digestibility are fed to horses, the starch which escapes small intestinal digestion ferments in the animals hindgut, causing hindgut acidosis and associated problems, including potentially career ending laminitis (Rowe 1999). The difficulty in industry at present is that there is very little known about the digestibility of the different grain species or about the variation in digestibility that occurs within a grain species.

A survey of 52 thoroughbred trainers in north-eastern NSW was conducted to determine which grains were being fed in this sector of the thoroughbred industry and how digestible these grains were. Samples of unprocessed grains were collected from the majority of the participants. Grain samples were ground and analysed for total starch content using the method of McCleary et al. (1997). Starch digestibility was estimated using an in vitro assay designed to predict small intestinal starch digestion (Bird et al. 1999).

Of the trainers surveyed, 81% fed oats; 75% fed corn; and 31% fed barley. When used, the average quantity of each grain fed per day was 3.55kg of oats; 1.80 kg of corn; and 1.28 kg of barley.

Table 1. The average and range of starch contents and in vitro starch digestibility for oats (n=29), corn (n=20) and barley (n=2).

<table>
<thead>
<tr>
<th>Grain</th>
<th>Starch Content (%)</th>
<th>Range (%)</th>
<th>Starch Digestion* (%)</th>
<th>Range (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oats</td>
<td>41.3</td>
<td>36.4 – 46.8</td>
<td>60.5</td>
<td>52.0 - 66.3</td>
</tr>
<tr>
<td>Barley</td>
<td>60.0</td>
<td>58.5 – 61.5</td>
<td>42.3</td>
<td>41.0 – 43.5</td>
</tr>
<tr>
<td>Corn</td>
<td>70.6</td>
<td>66.2 – 76.8</td>
<td>35.6</td>
<td>29.1 – 41.5</td>
</tr>
</tbody>
</table>

* Gives an indication of the amount of starch digested in 1hr, incubated at biological temperature with amylase and AMG.

Oats had the lowest average starch content, however the digestibility of oaten starch was greater than corn or barley. In contrast to oats, corn had the greatest percentage of total starch, but the lowest starch digestibility. Both oats and corn varied within their own species by more than 10 percentage points for starch content, while the variation within oats was >14% and within corn >12% for starch digestibility.

Variation in starch content and digestibility may be caused by differences in the seed coat and starch type, as well as other factors including the protein matrix structure, particle size and growth and storage conditions (Rowe et al. 1999). Trainers face the problem that, with no readily available method for assessing starch content or digestibility, they have no way of determining differences between species and batches of grain. With further development of the in vitro assays used here, industry will have access to tools that will allow the prediction of starch content and small intestinal starch digestion, prior to grains being fed. Using this information to adjust feeding practices will potentially allow the prevention of hindgut starch fermentation and the adverse effects associated with acid accumulation in the caecum and colon.


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