**Equine Nutrition**

The nonruminant herbivore

The how to, not to and think through

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**Digestive System**

- **Mouth**
  - 36-40 teeth
- **Esophagus**
- **Stomach**
  - only 10% of dig. System capacity (8-17 qts)
- **Small Intestine (duod., jej., ileum):**
  - ~70 ft long, major organ of digestion
  - 50-70% carbohydrate digestion and absorption
  - Amino Acid absorption
  - 30-60 minutes for food to pass through s.i.

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**Digestive System cont.**

- **Large Intestine**
  - **Cecum**
    - Blind sac ~4ft long
    - Microbial inoculation vat, similar to rumen of cow
    - Change of feed: takes ~ 3 wks to develop microbial pop. that can digest and maintain flow
  - **Colon**
    - 12 ft long, hold ~80qts – may reach here in as little as 7hrs and will stay 48-65hrs
    - Microbial digestion continues: VFA, vitamins, Fatty Acids and water
  - **Rectum**

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**Relative Capacities and proportional sizes of the digestive tracts of the pig, horse and bovine. Numbers give size of various compartments in gallons.**

Adapted from Ensminger and Olentine, 1978.
Diet Factors

- **Pasture**: ~1-5 acres to provide enough feed for one horse during the summer
- **Common Rule**: at least 2 acres/horse
- **Hay**: ~3lbs of green forage to provide same amount of 1lb of dried forage
- **Grass**: timothy, orchardgrass, bromegrass, tall fescue and Kentucky Bluegrass
- **Legume**: alfalfa, red clover

Feedstuff Rule of Thumb

- **Rule #1 for Energy**: 
  - TDN (or calories) for hay is about 50%; for grain ~75%
- **Rule #2 for Protein**: 
  - The protein content for alfalfa and clovers (legumes) is about 14-16%; for grasses it is about 7-10%

Most Common Concentrates

- **Corn**
  - Double the energy as oats, ~10% protein
- **Oats**
  - Its bulkiness makes oats less likely to cause digestive problems
  - 12-13% protein, but protein quality is not excellent

Feedstuff Rule of Thumb...

- **Rule #3 for Minerals**: 
  - Legumes are rich in calcium, but incorrect ratio to P (5:1); grasses are fair.
  - All forages are low in Phosphorus; grains are high in Phosphorus and low in Ca
- **Rule #4 for Vitamins**: 
  - Forages are high in vitamins; grains are low

<table>
<thead>
<tr>
<th>Mineral</th>
<th>Req.</th>
<th>Toxic Roughages</th>
<th>Grains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potassium</td>
<td>0.4</td>
<td>1.5-2.5</td>
<td>3-0.5</td>
</tr>
<tr>
<td>Mg, %</td>
<td>0.09</td>
<td>0.15-6</td>
<td>0.1-0.2</td>
</tr>
<tr>
<td>S, %</td>
<td>0.15</td>
<td>0.15-5</td>
<td>0.15-4</td>
</tr>
<tr>
<td>Fe, ppm</td>
<td>50</td>
<td>150-400</td>
<td>30-90</td>
</tr>
<tr>
<td>Zn, ppm</td>
<td>40-60</td>
<td>17-22</td>
<td>17-22</td>
</tr>
<tr>
<td>Mn, ppm</td>
<td>40</td>
<td>25-190</td>
<td>6-45</td>
</tr>
<tr>
<td>Cu, ppm</td>
<td>20-30</td>
<td>5-25</td>
<td>4-9</td>
</tr>
<tr>
<td>Co, ppm</td>
<td>0.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Se, ppm</td>
<td>0.1</td>
<td></td>
<td>5.0</td>
</tr>
</tbody>
</table>

Trace Mineral Levels Required, Toxic Levels and Levels Found in Feedstuffs
Energy Supplied by Feedstuffs for Specific Amounts of Work for a 500kg horse

<table>
<thead>
<tr>
<th>Activity</th>
<th>DE (Mcal/hr)</th>
<th>Kg alfalfa/hr</th>
<th>Kg corn/hr</th>
<th>Kg oats/hr</th>
<th>Kg fat/hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking</td>
<td>0.25</td>
<td>0.1</td>
<td>0.07</td>
<td>0.089</td>
<td>0.029</td>
</tr>
<tr>
<td>Medium</td>
<td>6.25</td>
<td>2.5</td>
<td>1.7</td>
<td>2.23</td>
<td>0.735</td>
</tr>
<tr>
<td>Strenuous</td>
<td>19.5</td>
<td>7.8</td>
<td>5.27</td>
<td>6.96</td>
<td>2.29</td>
</tr>
</tbody>
</table>

Comparing Junior Feeds – Guaranteed Analysis

- **Company A, $13.99**
  - CP, %: not < 14.5
  - Fat, %: not < 4.5
  - Fiber, %: not > 15
  - Ca min, %: not < 0.7
  - Ca max, %: not > 1
  - P min, %: not < .55%
  - Cu, ppm: not > 50
  - Zn, ppm: not < 175
  - Vit A, IU/lb: not < 3000
  - Se, ppm: not < .3

- **Company B, $13.59**
  - CP (min): 14%
  - Lys (min): 0.8%
  - Met+Cys: 0.4%
  - Thr: 0.5%
  - Fat (min): 10%
  - Fiber (max): 17%
  - Ca: .75-1.25%
  - P (min): 0.60%
  - Mg: 3%
  - Fe: 175 ppm
  - K: 1.5%
  - Mg: 3%
  - Se: .56 ppm
  - Zn: 170 ppm
  - Mn: 115 ppm
  - Cu: 50 ppm
  - Vit A, D, E, C, Biotin
  - Cellulase and Protease

Questions