Economic & Health Concerns for Sprouted Fodder

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Dairy and Field Crop Team
Good Management leads to Good Results.
Poor Management leads to Poor Results
Today's Goals

- First Goal of Sustainability is Profitability. Track your Costs
- Weighing your Cost to Health, Nutrient, and Environmental Benefits
- Health Concerns and Precautions
Comparing the Cost of Fodder
Lbs of Dry Matter

<table>
<thead>
<tr>
<th>Iowa State University Economics for 10 Cow Unit</th>
<th>COST/Lbs of Dry Matter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment</td>
<td>$0.04</td>
</tr>
<tr>
<td>Labor</td>
<td>$0.23</td>
</tr>
<tr>
<td>Seed</td>
<td>$0.12</td>
</tr>
<tr>
<td>Water</td>
<td>$0.01</td>
</tr>
<tr>
<td>TOTAL</td>
<td>$0.40/ lbs of DM</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ken Wilson's 150 Cow Unit</th>
<th>COST/Lbs of Dry Matter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment</td>
<td>$0.003</td>
</tr>
<tr>
<td>Labor</td>
<td>$0.07</td>
</tr>
<tr>
<td>Seed</td>
<td>$0.08</td>
</tr>
<tr>
<td>TOTAL</td>
<td>$0.153/lbs of DM</td>
</tr>
</tbody>
</table>

Dry Hay @ $140/ton and 90% DM = $0.063/ lbs of DM

Alfalfa Hay @ $200/ton and 90% DM = $0.09/ lbs of DM
## Comparing Nutrients*

<table>
<thead>
<tr>
<th>Feed</th>
<th>Total Digestible Nutrients (TDN)</th>
<th>Protein</th>
<th>Energy MJME/kg DM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barley Sprouts</td>
<td>78.4</td>
<td>16.7</td>
<td>11.8</td>
</tr>
<tr>
<td>Rye Grass Hay</td>
<td>68</td>
<td>10.4</td>
<td>10.3</td>
</tr>
<tr>
<td>Alfalfa Hay</td>
<td>60</td>
<td>18</td>
<td>9</td>
</tr>
<tr>
<td>Barley Grain</td>
<td>84</td>
<td>13.5</td>
<td>12.7</td>
</tr>
</tbody>
</table>

*Taken From “Hydroponic Fodder Review”*
Numbers Don’t Measure Availability

<table>
<thead>
<tr>
<th></th>
<th>Barley Grain</th>
<th>Barley Fodder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phosphorus %</td>
<td>.38</td>
<td>.30</td>
</tr>
</tbody>
</table>

What this doesn’t tell us is how much can the animal use.
Each Seed has a Suitcase Containing
What is needed for the first 7 days:
(Except Water)

- Starch
- Calcium
- Phosphorus
- Magnesium
- Potassium
- Sodium
- Iron
- Zinc
- Copper
- Manganese
- Molybdenum
Phytic Acid – Grains Dirty Secret

- Principal storage form of Phosphorus in many seeds. Is not digestible to humans or nonruminant animals.

- Ruminants do have the ability to break down some in the rumen.
Phytin

- Calcium Salt (Shown)
- Magnesium
- Zinc
- Iron
- Molybdenum
Germination – Key to Unlocking the Suitcase

Barley Seed Germination

Cotyledon

Epicotyl

Radicle

H₂O

imbibition

STARCH

SUGAR

amylase

RNA

DNA

GA₃

hydrolysis

Aleurone Cells

Seed Coat

Endosperm

Storage Protein

Amino Acids
The Little Things Make a Big Difference

Vitamin analysis based on 6-day grass samples (mg/kg DM)

<table>
<thead>
<tr>
<th>VITAMIN</th>
<th>BARLEY GRAIN</th>
<th>BARLEY SPROUTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>VITAMIN E</td>
<td>7.4</td>
<td>62.4</td>
</tr>
<tr>
<td>BETA-CAROTENE</td>
<td>4.1</td>
<td>42.7</td>
</tr>
<tr>
<td>BIOTIN</td>
<td>0.16</td>
<td>1.15</td>
</tr>
<tr>
<td>FREE FOLIC ACID</td>
<td>0.12</td>
<td>1.05</td>
</tr>
</tbody>
</table>

Source: Cuddeford (1989).
Health Concerns and Precautions
Molds has been the number one problem for Fodder Growers

- Main Source is on the seed

- In the soil, biology would eat much of it.

- Fusarium – Loves humidity, Common and Toxic
- Mucor – Grows on fodder but not in animals
- Aspergillus- Drought and excessive heat, Also Toxix
Prevention:

– Clean Seed

97.32% pure seed  (72.9930 gm)
1.64% inert  (1.6431 gm)
.41% other crop  (.3061 gm)
.08% other weed  (.0572 gm)

Other crop:
Wheat 11 found 67/lb.

Other weed:
Pennycress 2 found 12/lb.
Wild mustard  23 found 139/lb.
Curly dock  3 found 18/lb.
Mannagrass  1 found 6/lb.

500 grams tested for state noxious weed exam
Noxious Weed:
Bedstraw  5 found 5/lb.
Prevention:

Clean Your Environment Daily
Prevention:

Pre Soak in Disinfectant For 12 Hrs
Treatment - Disinfection

- All Treatments Take Time – That’s Why Prevention is Best

- Pre Soak 10-15 min. in a 20% chlorine solution. Prevents chlorine from getting through outer layer of seed.
How Much Can They Eat?

- Ruminants – Depends on Stage of life, 2.5% of Body Weight in wet fodder.
  - So easily digested it won’t stay in rumen long enough to be digested

- Chickens – Conventional birds need 95% of their diet grain.
  - There are breeds that can get as much as 20-25% from fodder.

- Pigs can consume 20 - 30% of their diet from fodder when acclimated.
How Well is Your System Working
How Well is Your System Working
Different Ideas
Different Ideas