American Proteins Inc.

Nuts and Bolts of Rendering
(Overview of Rendering)

IPPE International Rendering Symposium
01/31/2014
U.S. Animal Agriculture Annual Production

- 35 million cattle (49% of live wt. not used for human food)
- 100 million hogs (44% not used for human food)
- 8 billion chickens (37% not used for human food)
- 280 million turkeys (36% not used for human food)
The Rendering Industry (U.S. and Canada)

- 273 facilities in the U.S. and 29 in Canada
- $3.5 billion annual revenue
- 26.3 MMT (59 billion lb) raw material each year
- 72.3 million kg raw material each day
Housewives!

SAVE WASTE FATS FOR EXPLOSIVES!

Take them to your meat dealer
What is Rendering?

Rendering is Cooking and Drying.
Rendering is Recycling and Repurposing.
Rendering is Essential to Public Health.
Rendering is Essential

- To protect the environment
- To protect human health
- To protect animal health
- It is sustainable and contributes to sustainability of animal agriculture
The industry converts more than 26.3 MMT (59 billion lb.) of animal by-products into usable commodities annually.

- Highly valued protein supplements for livestock, poultry, pets
- Tallow for the manufacture of fatty acids and as a source of energy in feed rations.
### U.S. Production of Rendered Fats

<table>
<thead>
<tr>
<th>Product</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Inedible Tallow</em></td>
<td>1,531.1*</td>
<td>1,511.2</td>
</tr>
<tr>
<td><em>Yellow Grease</em></td>
<td>740.3</td>
<td>569.2</td>
</tr>
<tr>
<td><em>Other Greases</em></td>
<td>550.0</td>
<td>588.3</td>
</tr>
<tr>
<td><em>Edible Tallow</em></td>
<td>833.4</td>
<td>827.6</td>
</tr>
<tr>
<td><em>Lard</em></td>
<td>157.0</td>
<td>130.4</td>
</tr>
<tr>
<td><em>Poultry Fat</em></td>
<td>625.4</td>
<td>638.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>4,437.3</td>
<td>4,264.5</td>
</tr>
</tbody>
</table>

*Thousands of metric tons (metric ton = 2240 lb.)*

Source: Render Magazine April 2011.  www.rendermagazine.com
Protein Meals – 11 billion pounds*
125 AAFCO-defined animal by-products

- Meat Meal
- Meat and Bone Meal (can be species specific)
- Blood Meal (Flash/Spray/Ring/Batch Dried)
  – Can be whole or only hemoglobin
- Poultry By-Product Meal
- Poultry Meal
- Hydrolyzed Poultry Feather Meal

5 Million Metric tons
Sustainability

- The rendering industry fits perfectly with Sustainable Agriculture by processing by-products of animal agriculture into valuable feed ingredients for livestock rations.
Raw Materials

- Offal
- Bones and fat
- Blood
- Animals dead on arrival, in transit or on farms
- Restaurant grease
- Feathers
- Recalled meat
## Examples of a Few Finished Products

<table>
<thead>
<tr>
<th>Hydrolyzed Poultry Feather Meal</th>
<th>Stabilized Poultry Fat</th>
<th>Stabilized Pet Food Poultry Fat</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Stabilized Poultry Protein Meal**
- **Low Ash Pet Food Poultry Protein Meal**
- **Pet Food Poultry Protein Meal**
Rendering is Cooking and Drying

- Continuous flow or batch
- Steam cookers
- 115° to 145° C. for 40 to 90 minutes (245° to 290° F.)
- Inactivation of bacteria, viruses, protozoa, and parasitic organisms.
The Basic Production Process of Rendering

1. Raw Materials
2. Sizing
3. Heat Processing (Time x Temperature)
4. Protein
5. Press
6. Fat Clean-up
7. Storage/Load out
8. Grinding

Process Control or GMP Points
Receiving
Grinding
Cooking
Pressing or Separation
Grinding/ Sizing
Centrifugation
Biosecurity

Animal Protein Producers Industry (APPI)

APPI was organized in 1984 to develop a voluntary Salmonella education and monitoring program. APPI’s role has since been expanded to address virtually all food security issues.

www.animalprotein.org

David L. Meeker, Ph.D, MBA
Continuous Improvement for Renderers

Animal Protein Producers Industry (APPI)

- Process Control
- Rendering Code of Practice
- Continuing Education
FPRF was organized in 1962 to direct and manage research to increase usage of, and to develop new uses for rendered animal products to add value to all animal production.
Rendering uses HACCP principles for feed safety

Rendering Code of Practice
- Based on HACCP-like (Hazard Analysis Critical Control Point) principles
- Follows written procedures and process controls for feed safety
- Verified by third party auditors
- Fits FDA’s emphasis in implementing FSMA

![Diagram showing the process flow of rendering with key steps including Raw Material, Sizing, Grinding, Protein, Press, Storage/Load-out, Decanting, Heat Processing, and Fat clean-up. Each step is connected with arrows representing the flow of process, and icons indicate inspections, certifications, temperature, compliance testing, and labeling.](image-url)
## Decomposing Tissues Contain Bacteria of Concern

<table>
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<th>Bacteria</th>
<th>Raw Tissue</th>
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<tr>
<td><em>Clostridium perfringens</em></td>
<td>71.4%</td>
</tr>
<tr>
<td><em>Listeria species</em></td>
<td>76.2%</td>
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<tr>
<td><em>L. Monocytogenes</em></td>
<td>8.3%</td>
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<tr>
<td><em>Campylobacter species</em></td>
<td>29.8%</td>
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<tr>
<td><em>C. Jejuni</em></td>
<td>20.0%</td>
</tr>
<tr>
<td><em>Salmonella species</em></td>
<td>84.5%</td>
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Rendering Destroys Bacteria of Food Safety Concern

<table>
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<tr>
<th>Bacteria</th>
<th>Raw Tissue</th>
<th>Post-Press</th>
</tr>
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<tbody>
<tr>
<td>Clostridium perfringens</td>
<td>71.4%</td>
<td>0%</td>
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<td>Listeria species</td>
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Perspective

PET FOOD?
Can I get the other two to go in a doggy bag.
Our Green Impact

Rendering Annually Recycles (million lb):

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>U.S. Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon</td>
<td>10,511</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>1,072</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>384</td>
</tr>
</tbody>
</table>

Rendering protects the environment:

- If not recycled, the large amounts of carbon, nitrogen, and phosphorus present in inedible animal by-products may contribute to global warming, soil loading, and water contamination.
- U.S. rendering facilities utilize world-class processing equipment, treatment processes, and control equipment to minimize the impact on the local environments’ air and water.
## Rendering’s Carbon Footprint

- Recycling fat and protein **significantly reduces** the amount of greenhouse gases, such as CO$_2$, released into the environment.

<table>
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<th>Item</th>
<th>U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO$_2$ equivalents recycled, metric tons/year</td>
<td>66,958,000</td>
</tr>
</tbody>
</table>

- According to the US-EPA, the CO$_2$ renderers recycle each year is equivalent to the following actions taken to reduce greenhouse gases:

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<th>Greenhouse gas reduction strategy</th>
<th>U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of cars taken off the road per year</td>
<td>12,263,370</td>
</tr>
<tr>
<td>Seedling trees planted per year</td>
<td>1,716,871,791</td>
</tr>
<tr>
<td>Tons of garbage diverted from landfills per year</td>
<td>23,088,966</td>
</tr>
</tbody>
</table>
The modern rendering industry invests heavily in odor control and air pollution equipment.
The modern rendering industry invests heavily in modern equipment to control water pollution.
Rendering sequesters at least 5 times as much greenhouse gas as it emits!
Many plants are even better/more efficient!

This calculator is available on FPRF website:  
http://fprf.org/
Sustainability

- Good Nutrition for animals:
Additional information on NRA Website: http://nationalrenderers.org/
Additional information in a book available from the National Renderers Association

Free download: nationalrenderers.org under “Publications”

This presentation is for educational purposes only.

Edited by David L. Meeker