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Background of the Heart Health Claim

• **National Barley Foods Council** submitted a petition to FDA based on the experiment of human clinical study conducted for over 6 years.
  - 10 Participants were fed food containing 1) whole wheat or brown rice, 2) $60g$ of barley or 3) $120g$ of barley for 5 weeks.
  - Blood samples were collected and tested for blood lipid and cholesterol level.
  - Total and LDL cholesterol were reduced as a result of barley consumption.

• Petition was finalized and approved in 2006.
Heart Health Claim: 21 CFR 101.81

- **Sample Claim**
  - “Soluble fiber from foods such as (name of food), as part of a diet low in saturated fat and cholesterol, may reduce the risk of heart disease. A serving of (name) supplies (x) g of the soluble fiber necessary per day to have this effect”.
- There are requirements to use the claim…
Requirements of the Claim

1. Food must supply **3g/day** or **0.75g/serving** of β-glucan.

2. Barley must contain a certain percentage of β-glucan depending on the processing method (Shown in next slide).

3. Food has to be **low in fat, saturated fat, cholesterol** and **sodium** to use the claim.
**Restriction of Heart Health Claim**

- **Raw material requirement**

<table>
<thead>
<tr>
<th>Raw materials</th>
<th>Processes</th>
<th>Min. β-glucan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole grain Barley</td>
<td>Hulless, dehulled</td>
<td>&gt;4%</td>
</tr>
<tr>
<td>Dry milled Barley</td>
<td>Meal, grits, flour, pearled and flakes</td>
<td>&gt;4%</td>
</tr>
<tr>
<td>Extracts</td>
<td>Barliv</td>
<td>&gt;70%</td>
</tr>
</tbody>
</table>
Health Benefits of Barley

• Effect on lowering cholesterol and blood lipid.
  – β-glucan extract and concentrated β-glucan are found to demonstrate the same effect (Smith et al, 2008).
  – Some studies disagree, requiring the further investigation.

• Decrease appetite, increase satiety (Peters et al, 2009).
  – Fiber contributes to increase in satiety
## Nutritional Content of Barley

### Macronutrient

<table>
<thead>
<tr>
<th>Nutrient (Unit)</th>
<th>Value (per 100g)</th>
<th>Energy (Kcal)</th>
<th>356</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein (g)</td>
<td>15.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbohydrates (g)</td>
<td>70.30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Lipid (g)</td>
<td>3.0</td>
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</tr>
<tr>
<td>Total dietary fiber (g)</td>
<td>15.0</td>
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</tr>
<tr>
<td>Soluble fiber (g)</td>
<td>6.5</td>
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<td></td>
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</tbody>
</table>

### Micronutrient

<table>
<thead>
<tr>
<th>Nutrient (Unit)</th>
<th>Value (per 100g)</th>
<th>Calcium (mg)</th>
<th>33</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron (mg)</td>
<td>3.6</td>
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<tr>
<td>Magnesium (mg)</td>
<td>133</td>
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<tr>
<td>Phosphorus (mg)</td>
<td>264</td>
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<tr>
<td>Potassium (mg)</td>
<td>452</td>
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<tr>
<td>Manganese (mg)</td>
<td>1943</td>
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<tr>
<td>Selenium (mg)</td>
<td>37.7</td>
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</tr>
<tr>
<td>Carotene, Beta (mcg)</td>
<td>133</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitamin A (IU)</td>
<td>22</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Nutritional Content of Barley

• Relatively high in
  - Vitamin A
  - Vitamin C
  - Calcium
  - Iron
  - Protein
  - Fiber
  - Natural antioxidant

• Low in
  - Fat (<3g)
  - Saturated fat (<1g)
  - Cholesterol (<20 mg)
  - Sodium (<480 mg)
β-glucan in Barley

• Higher in both total fiber and soluble fiber than oats or rye.

»β-glucan in barley is spread throughout the kernel so pearling process does not affect the amount of β-glucan.
Hot Topic = β-glucan Extract

• In 2008, the claim was expanded to include extracts.

• This is based on the research which demonstrated that extracts have the same effect as regular barley.

• The product approved is Barliv from Cargill – Concentrated β-glucan powder provides a lower viscosity, therefore can be used for beverages.
  • Does not affect the functionality of products except water absorption.
  • Used in supplements or drinks.
Examples of Extract Functionality
Functional Characteristics of Barley

1. Increased **water absorption**.
   - Fiber absorbs more water.
2. Barley flour provides **higher volume**.
3. Improves **flavor** characteristics.
4. Affect **loaf volume** of bread product.
   - Lower gluten property.
5. β-glucan provides **higher viscosity**.
Connecting in the Global Marketplace

Baked Products with Hulless Barley

Control    Barley    Bagels

90% Barley Cupcake    100% Barley Cookies    French Bread
Progressive Promotional Activities for Food Barley Promotion

• Some progressive activities were held since initiation of food barley promotion project at NCI.
  – Conducting short term investigation on functionality of barley.
    • Product development (including processing)
    • Sensory tests
    • Analytical testing
  – Hosting seminars for domestic and international barley users for educational purposes.
  – Consulting with domestic as well as international companies.
Current Status of the Food Barley Market in the U.S.

• **Consistent supply and demand on pearled barley sector.**
  – Asian market traditionally uses pearled barley in their food and therefore they are the main consumer of the pearled barley.
  – High demand exists in soups and cereal products.

• **Hulless barley thrives to be recognized as a specialty grain.**
  – Barley is getting more attention from people with highly health conscious.
  – Promotional activities are necessary to further increase its popularity and usage.
Future Perspectives of the Food Barley Market

• Barley as a functional food.
  – Fractionation of barley such as barley fiber, bran, protein could be possible.

• β-glucan extracts have a potential to be the leading products of food barley.

• Barley as a part of whole grain – the most realistic way.
SO WHY THE U.S. BARLEY IS SO SPECIAL?

- Advanced research and progressive varietal development effort.
- Better nutritional profile including exceptionally high fiber (soluble & insoluble) profile.
- Improved functional characteristics.
- Wide varieties on type of barley (hulled, hulless, level of β-glucan, etc.).
Any Questions?

Thank you for your time!

For further information and inquires on reference materials, please contact:

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