GLABROUS CANARY SEED
On the Cusp of Food Approval

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AGM
Canaryseed Development Commission of Saskatchewan
January 12, 2015
Crop Breeding 1990s

Regulatory Approval - Almost There 2015
Current Regulatory Status

- Health Canada review as a novel food (new cereal grain)—GETTING CLOSER!

- Moving through the GRAS system in the United States

- Anticipated Approvals: 2015
Canaryseed Groat Colour

Photos: P. Hucl, UofS
## Proximate Composition

<table>
<thead>
<tr>
<th>Proximate Composition (% Dry Matter)</th>
<th>Brown Canaryseed groats</th>
<th>Yellow Canaryseed groats</th>
<th>Wheat (Hard Red)</th>
<th>Oats</th>
<th>Lentils</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein (N x 6.25)</td>
<td>23.4</td>
<td>23.0</td>
<td>16.8</td>
<td>14.9</td>
<td>25.0</td>
</tr>
<tr>
<td>Crude Fat</td>
<td>6.2</td>
<td>6.1</td>
<td>2.5</td>
<td>3.1-11.6</td>
<td>1.1</td>
</tr>
<tr>
<td>Dietary Fibre</td>
<td>8.6</td>
<td>7.9</td>
<td>12.8</td>
<td>8.2</td>
<td>18-25</td>
</tr>
<tr>
<td>Starch</td>
<td>56.1</td>
<td>59</td>
<td>59.8</td>
<td>50-55</td>
<td>45</td>
</tr>
<tr>
<td>Ash</td>
<td>2.3</td>
<td>2.2</td>
<td>1.6</td>
<td>3.4</td>
<td>2.6</td>
</tr>
</tbody>
</table>
# Free Fatty Acids

<table>
<thead>
<tr>
<th>Free Fatty Acid Composition (% of fat)</th>
<th>Brown Canaryseed groats</th>
<th>Yellow Canaryseed groats</th>
<th>Wheat (Hard Red)</th>
<th>Oats</th>
<th>Millet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crude Fat</td>
<td>6.2</td>
<td>6.1</td>
<td>2.5</td>
<td>3.1-11.6</td>
<td>5.1</td>
</tr>
<tr>
<td>Palmitic (16:0)</td>
<td>13</td>
<td>12.6</td>
<td>17-24</td>
<td>15.26</td>
<td>20-22</td>
</tr>
<tr>
<td>Stearic (18:0)</td>
<td>1.4</td>
<td>1.49</td>
<td>1-2</td>
<td>1-3.9</td>
<td>6.1-10.1</td>
</tr>
<tr>
<td>Oleic (18:1)</td>
<td>34.1</td>
<td>32.7</td>
<td>8-21</td>
<td>26-41</td>
<td>17-28</td>
</tr>
<tr>
<td>Linoleic (18:2)</td>
<td>56.3</td>
<td>58.1</td>
<td>55-60</td>
<td>31-46</td>
<td>37-32</td>
</tr>
<tr>
<td>Linolenic (18.3)</td>
<td>2.4</td>
<td>2.11</td>
<td>3-5</td>
<td>0.9-2.1</td>
<td>2.2-4.2</td>
</tr>
</tbody>
</table>
# B Vitamins and Select Minerals

<table>
<thead>
<tr>
<th>B Vitamins &amp; Minerals (mg/100g)</th>
<th>Brown Canaryseed groats</th>
<th>Yellow Canaryseed groats</th>
<th>Wheat (Hard Red)</th>
<th>Oats</th>
<th>Lentils</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thiamine (B1)</td>
<td>0.8</td>
<td>0.67</td>
<td>0.57</td>
<td>0.65</td>
<td>0.17</td>
</tr>
<tr>
<td>Riboflavin (B2)</td>
<td>0.11</td>
<td>0.09</td>
<td>0.12</td>
<td>0.11</td>
<td>0.08</td>
</tr>
<tr>
<td>Niacin (B3)</td>
<td>1.33</td>
<td>1.08</td>
<td>7.29</td>
<td>1.0</td>
<td>1.06</td>
</tr>
<tr>
<td>Pyridoxine (B6)</td>
<td>0.19</td>
<td>0.18</td>
<td>0.35</td>
<td>0.20</td>
<td>0.25</td>
</tr>
<tr>
<td>Folate</td>
<td>0.07-0.12</td>
<td>0.07-0.10</td>
<td>0.02-0.09</td>
<td>0.06-0.07</td>
<td></td>
</tr>
<tr>
<td>Calcium</td>
<td>30.8</td>
<td>29.7</td>
<td>20</td>
<td>56.2</td>
<td>19.2</td>
</tr>
<tr>
<td>Magnesium</td>
<td>220</td>
<td>207</td>
<td>155</td>
<td>120</td>
<td>120</td>
</tr>
<tr>
<td>Iron</td>
<td>7.5</td>
<td>7.2</td>
<td>4.2</td>
<td>6.0</td>
<td>7.5</td>
</tr>
<tr>
<td>Zinc</td>
<td>3.4</td>
<td>2.9</td>
<td>3.2</td>
<td>3.9</td>
<td>4.0</td>
</tr>
</tbody>
</table>
Antinutritional Factors

• Phytic acid is a little higher than other cereals and similar to peas, lentils and chickpeas

• Trypsin inhibitor and amylase inhibitors similar to other cereal grains

• Phenolics: higher TPC in cs (179-205mg/100g) compared to whole wheat meal (79-125 mg/100g)
Allergenicity

No cross reactivity between canaryseed and other major plant allergens (soya bean, mustard, tree nuts, peanuts, and sesame)

Surprising find--
Canaryseed is gluten-free
Photos: CIGI
Roasted Yellow CS Muffins

Whole groat canaryseed “Snaps”

Photos: CIGI & Guelph Food Research Centre
Gluten Free Products

Brown CS

15%  20%  25%

Yellow CS

15%  20%  25%
New Projects 2014-2016

Product Development
- Flour Rheology
- Extrusion
- Starch Characterization for Industrial Uses

Nutritional Benchmarking
- 4 Browns, 6 Yellow
- Protein, CHO, fat, vitamins, minerals, fatty acids, amino acids, phytate

Funded by ADF
Next Steps

- Address concern regarding potential wheat allergenicity
- Approval of minor use crop protection products for canary seed as food use
- Canary seed designation within Crop Group 15
The Future: Promotion of Canaryseed as Whole Grain

True Cereals
• Wheat including spelt, emmer, farro, einkorn,
• Kamut, durums
• Rice, African rice
• Barley
• Corn (Maize, Popcorn)
• Rye
• Oats
• Canary Seed
• Job’s Tears
• Fonio, Black Fonio,
• Asian Millet

True Cereals
• Millets
• Sorghum
• Teff (tef)
• Triticale
• Wild rice

Pseudocereals
• Amaranth
• Buckwheat, Tartar Buckwheat

*American Association of Cereal Chemists International
The Future

- Marketing & Promotional Support for Food Use
  - Other Specialty Crop Commodity as Examples

Let’s get cooking with PULSES!
Funding Support

1) Canaryseed Development Commission of Saskatchewan (levy $)
2) Agriculture and Agri-Food Canada’s ACAAFS and CAAP programs
3) SK Ministry of Agriculture’s Agriculture Development Fund (ADF)
Contact & Questions

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ALPISTE
A New
Gluten –Free Cereal