Nutritional Content of Lima Beans

Nicole Odom and Jason Thon
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**Cowpoke Chili**

1 lb ground beef  
1 small onion, chopped  
1 garlic clove, minced  
1 can (10.5 oz.) condensed beef broth  
1 can tomato sauce  
1 can tomato paste  
1 can hot chili beans, undrained  
1 can black beans, rinsed and drained  
2 tablespoons sugar  
1 tablespoon butter  
1 teaspoon chili powder  
1/4 teaspoon salt  
1/4 teaspoon dried oregano  
1/8 teaspoon ground cumin  
1/8 teaspoon crushed red pepper flakes  
Dash cayenne pepper  
2 cups frozen lima beans, thawed

In a large saucepan, cook beef and onion over medium heat until meat is no longer pink. Add garlic; cook 1 minute longer. Drain. Stir in the broth, tomato sauce and paste until blended. Add the next 10 ingredients. Bring to a boil. Reduce heat; cover and simmer for 30 minutes.

Add lima beans; cook 5-10 minutes longer or until beans are tender. Garnish with tomatoes, oregano and peppers if desired. Yield: 7 servings.

Background

- Grown in various states and Peru
- Available at most grocery stores and online
- $1-2 per pound

## Nutritional Content of Lima Beans

<table>
<thead>
<tr>
<th>Macronutrient or Electrolyte</th>
<th>Content (Gram/1 Cup Lima Beans)</th>
<th>% Daily Recommended Allowance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiber</td>
<td>13.20</td>
<td>34.7</td>
</tr>
<tr>
<td>Protein</td>
<td>14.66</td>
<td>26.2</td>
</tr>
<tr>
<td>Carbohydrates</td>
<td>39.25</td>
<td>30.2</td>
</tr>
<tr>
<td>Total Fat</td>
<td>(7.1 \times 10^{-1})</td>
<td>-</td>
</tr>
<tr>
<td>Sodium</td>
<td>(4.00 \times 10^{-3})</td>
<td>0.2</td>
</tr>
</tbody>
</table>

All calculations based on intakes recommended for 19-30 year old male.

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Health Benefits

- Provide energy
- Promotes bowel health
- Facilitate cell communication and production
- Aides in weight loss by controlling appetite
- Low glycemic index value (32), aides in maintaining healthy blood sugar levels
Phytochemical Content

- Lima beans have contain many different classes of phytochemicals, including alkaloids, flavonoids, saponins, and tannins

Flavonoids

- Absorbed in the GI tract
- Strong antioxidant and phytoestrogenic effects


**Coumestrol**

3,9-Dihydroxy-6-benzofurano[3,2-c]chromenone

- Polyphenol found abundantly in lima beans
- Responsible for the lowered risk of hormonal cancers


Determined through stepwise degradation

Confirmed by Mass and 1H NMR spectra.
Biosynthesis

- Coumestrol is directly synthesized in plants as a mechanism of disease resistance
- Daidzein is an abundant precursor of two competitive pathways
- Major pathway: 2’-hydroxylation of dihydrodaidzein, followed by cyclization and oxidation
- Minor pathway: 2’-hydroxydaidzein as an intermediate, followed by cyclization and oxidation

**Processing Effects**

- Pulses undergo conformational and chemical changes through boiling, baking, toasting, and steaming.
- Research has shown the effects of processing on lima bean fiber, proteins, minerals, and lipids.
- No data was obtainable in support of the effects on phytochemical content in lima beans.

Adeparusi, E. O. Effect of processing on the nutrients and antinutrients of lima bean (p. lunatus L.) flour. FOOD 2001, 45, 94-96.
Phytoestrogen Function

- Plant-derived compounds that functionally mimic estrogenic compounds within the body
- Impact hormone dependent cancers including breast and prostate cancer through inhibition of the growth of cancerous cells

Coumestrol

- Binds the ER-β estrogen receptor, which mediates growth promoting effects of oestrogens

Highly selective and reversible ATP competitive CK2 inhibitor

• A549, Jurkat, and Hela cells were cultured in increasing concentrations of coumestrol
• Each of the three cancer cell line viabilities were inhibited

Summary

- **Nutritional Benefits:**
  - Provide energy, aid in weight loss, maintain healthy blood sugar levels
- **Phytochemical:**
  - Coumestrol, lowers risk of hormonal cancers
- **Biosynthesis:**
  - Daidzein precursor, 2 pathways
- **Processing Effects:**
  - No data supporting effects on phytochemical content
- **Function:**
  - Binds the ER-β estrogen receptor, which mediates growth promoting effects of oestrogens