Frequently Asked Questions

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1 - Manufacturing Process

Selecta’s plant has the most up to date technology and modern manufacturing concepts for large scale production of Soy Protein Concentrate (SPC) and other soy based products.

The plant is fully automated and it has a continuous production line which ensures stable process conditions and product quality, resulting also in stable nutritional value of products.
How to evaluate the protein quality in SPC?

A - Solubility in potassium hydroxide - KOH

The potassium hydroxide (KOH) protein solubility is a commonly used method to evaluate protein quality and digestibility in soybean meal. But for soy protein concentrate the KOH solubility parameter is not suitable, due to the interference of ethanol extraction on manufacturing process of SPC.

**METHODOLOGY:**
M. ARABA & DALE N.M. 1990 Poutry Science v.69:, p.76-83.
SOLUBILITY IN POTASSIUM HYDROXIDE – KOH

**DESCRIPTION:**
Soluble proteins in KOH methodology was created by Araba & Dale for measuring the efficiency of chicken to absorb nutrients of soybean meal.

High temperatures degrade the protein and due to this factor happens to denaturation of the amino acid Lysine. Then, soybean meal loses its nutritional value when heated at high temperatures for prolonged periods.

**THE CORRELATION ESTABLISHED BY ARABA & DALE (1990) DOES NOT APPLY TO SPC**

Solubility in KOH is relatively low for SPC because a significative amount of sugars is removed during the alcoholic extraction, and sugars are highly soluble. For this reason, the solubility of the SPC in KOH is lower than conventional soybean meal. It is important to highlight that sugars removed at SPC manufacturing process are oligosaccharides, especially raffinose and stachyose, considered anti-nutritional factors.

- Typical value KOH Solubility of SPC: Up to 60%
- Typical value KOH Solubility Soybean meal From 80%

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**Ideal SPC Protein Quality Indicators**

- Free Lysine: < 0.05%
- Pepsin digestibility = 93%

**SPC PROTEINS ARE HIGHLY DIGESTIBLE**

The very low Free Lysine content in soy protein concentrate shows that there is almost no loss of amino acids along SPC manufacturing process. The heating and alcohol extraction do not cause damages in protein integrity.
B - Protein Dispersibility Index - PDI Values

- Protein Dispersibility Index – denotes the solubility of a protein in water, and is widely used in the SBM evaluation.

- For fish diets: Low PDI of Soy Protein Concentrate avoid losses of valuable protein in water.

- Internationally there is no pattern of PDI for Soy Protein Concentrate.

- Typical values for SPC are below 10%

C - Anti-nutritional Factors

The best quality control criteria for soy protein concentrate is to monitor the anti nutritional factors. The main parameters for quantification are described below:

- Trypsin inhibitor activity

- Oligosaccharides, such as raffinose and stachyose

- Glycoproteins: Beta-conglycinin and glycinin

A well processed SPC is recognized by its low antigen and antinutritional factors and high digestibility of amino acids.

3 - Comparative: X-SOY versus other soy products

Nutrient composition (%) of soybeans, soybean meal (SBM) and other soybean products (Values expressed in as fed basis)

<table>
<thead>
<tr>
<th>Products</th>
<th>Full fat soybeans</th>
<th>Dehulled SBM</th>
<th>Nondehulled SBM</th>
<th>Extruded-expelled SBM</th>
<th>Enzyme treated SBM</th>
<th>Fermented SBM</th>
<th>Soy protein concentrate</th>
<th>Soy protein isolate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry Matter</td>
<td>92.36</td>
<td>89.98</td>
<td>88.79</td>
<td>93.85</td>
<td>92.70</td>
<td>92.88</td>
<td>92.64</td>
<td>93.71</td>
</tr>
<tr>
<td>Crude Protein</td>
<td>37.56</td>
<td>47.73</td>
<td>43.90</td>
<td>44.56</td>
<td>55.62</td>
<td>54.07</td>
<td>65.20</td>
<td>84.78</td>
</tr>
<tr>
<td>Ether Extract</td>
<td>20.18</td>
<td>1.52</td>
<td>1.24</td>
<td>5.69</td>
<td>1.82</td>
<td>2.30</td>
<td>1.05</td>
<td>2.76</td>
</tr>
<tr>
<td>Carbohydrates and Lignin</td>
<td>29.73</td>
<td>34.46</td>
<td>37.27</td>
<td>37.90</td>
<td>28.21</td>
<td>29.53</td>
<td>20.28</td>
<td>2.00</td>
</tr>
<tr>
<td>Ash</td>
<td>4.89</td>
<td>6.27</td>
<td>6.38</td>
<td>5.70</td>
<td>7.05</td>
<td>6.98</td>
<td>6.11</td>
<td>4.17</td>
</tr>
</tbody>
</table>

Source: NRC, 2012
The prevalence and concentration of mycotoxins in soy products are extremely lower than corn products.

The table and chart show the percentage of positive samples for each mycotoxin in corn gluten meal, soybean meal, and corn. The prevalence of mycotoxins is significantly lower in soy products compared to corn products. For instance, the percentage of positive samples for aflatoxin (AFLA) is 25 in corn gluten meal, 18 in soybean meal, and 32 in corn. Similarly, for zearalenone (ZEN), the percentage of positive samples is 43 in corn gluten meal, 26 in soybean meal, and 43 in corn. This trend is consistent across all mycotoxins listed, including deoxynivalenol (DON), fumonisin (FUM), and ochratoxin (OTA).

The chart highlights that soy products have a minimum risk of mycotoxin contamination, with soybean meal showing the least prevalence compared to corn gluten meal and corn. This indicates that soy products are more resistant to mycotoxin contamination, making them safer for consumption.
5 - Why should I buy X-SOY?

Despite all benefits of soy protein concentrate:

- **Selecta produces exclusively SPC**

- **Excellence in process manufacturing**
  - Continous line of production

- **Unique Micronization Process**
  - No Damages for protein quality

- **High Quality Standards**

For additional information, contact us: x-soy@selecta.com.br