Benefits of Using Pulse Proteins

- Important protein source in human and animal nutrition – can be used to fortify foods
- Ideal for blending with other protein sources or food components
- High quality protein source to complement lysine deficiencies in cereals
- Good source of protein for vegetarians

- No cholesterol
- Low fat
- Non-GM
- Low allergenicity
- Highly digestible
- Gluten free

References

PROTEINS

Pulse flours, protein concentrates and isolates provide the most accessible, highest concentrations of globulins making them a good choice for commercial protein and protein concentrates and isolates. Vicilin-like globulins have high foaming capacity and legumin-like globulins have high emulsifying capacity. Compared to soy, most pea globulins are always higher in vicilin than legumin.

Processing of Protein Concentrates and Isolates

Both dry and wet processing methods can be used to yield protein products with different characteristics and functionalities. Wet processing typically yields a higher concentration of protein while maintaining a lower concentration of starch and other non-protein components. Dry processing methods may yield products with different protein content and functionality depending on the processing conditions and the type of pulses used.

Canadian Research Expertise

R. Aluko, Department of Human Nutritional Sciences, University of Manitoba, Winnipeg, MB
- Characterization, structure and function of plant seed proteins

J. Han, Department of Food Science, University of Manitoba, Winnipeg, MB
- Measuring the functional properties of proteins

J. Boye, Food Research and Development Centre, Agriculture and Agri-Food Canada, Ste. Hyacinthe, PQ
- Characterization, structure and function of plant seed proteins

R. Tyler, Department of Human Nutritional Sciences, University of Saskatchewan, Saskatoon, SK
- Characterization, structure and function of plant seed proteins

High Quality Canadian Ingredients.

www.pulsecanada.com

Applications

- Bakery products
- Snack foods
- Extruded products
- Pastas
- Meat extenders in processed meats

- Beverages (drinks, smoothies, shakes),
- Nutrition bars
- Meat products
- Texturized products in meat replacements products
- Edible films
- Soup products

Globulin proteins in pulses provide functionality

In pulses, water-soluble albumins, and salt-soluble globulins predominate, with prolamins and glutelins present in smaller concentrations. Globulin proteins contribute most to the functionality of food products. Of all pulses, peas provide the most accessible, highest concentrations of globulins making them a good choice for commercial protein concentrates and isolates.

All pulse globulins are composed of two major proteins – 11S legumin-like and 7S vicilin-like proteins. Both the concentrates and isolates provide the most accessible, highest concentrations of globulins making them a good choice for commercial protein concentrates and isolates.

Pea protein,

- 1.09 g/g  1.59 g/g  565  37.2 ml/100g sample
- Soybean protein isolate (82.3% protein) 2.65 g/g  1.03 g/g  120%  45.1 ml/100g sample

Proteins

1.09 g/g  1.59 g/g  565  37.2 ml/100g sample

Soybean protein isolate (82.3% protein) 2.65 g/g  1.03 g/g  120%  45.1 ml/100g sample

Dehulled bean flours 1.66–4.36 g/g  1.34–1.59 g/g  121–133  64–94% “instant gel” from 14–20%

Field pea 20.2–27.4 g/g  41.6–49.0 g/g  20.7–33.7 g/g  5.8–8.7 g/g  8.4–11.2 g/g  1.0–1.7 g/g  2.3–3.4 g/g

Chick pea 17.9–30.8 g/g  31.3–43.9 g/g  20.5–29.2 g/g  3.0–13.5 g/g  4.2–13.6 g/g  4.4–6.9 g/g  2.7–3.8 g/g

Beans** 19.7–34.3 g/g  31.8–46.3 g/g  19.9–29.6 g/g  5.9–9.3 g/g  7.3–12.8 g/g  0.7–2.3 g/g  3.2–4.7 g/g

Lentil*** 21.3–30.2 g/g  41.5–48.5 g/g  22.5–28.3 g/g  4.5–7.4 g/g  7.0–9.5 g/g  1.0–1.3 g/g  2.3–3.5 g/g

Biochemical Composition of Select Canadian Pulses (g/100g dry matter)

| Protein    | Water Holding Capacity (WHC) | Oil Holding Capacity (OHC) | Foam Capacity (% volume increase) | Foam Gelation | Gelatin
|------------|-----------------------------|---------------------------|----------------------------------|--------------|--------
| Crude Protein (dry basis-whole seed) | 15–32%                      | 18–25%                    | ~22%                             | 27.9–32.1%   |        |
| Globulins  | 65–85%                      | 55–80%                    | 42%                              | 51%          |        |
| Albinums   | 20–35%                      | 10–20%                    | 16%                              | 11–16%       |        |
| Globulins  | 12%                         | 10%                       | 9.9                               | 11%          |        |
| Albinums   | ~1%                         | ~1%                       | 0.4%                             | 3.5%         |        |

Pulse flours, protein concentrates and isolates

- Bake products
- Snack foods
- Extruded products
- Pastas
- Meat extenders in processed meats
- Beverages (drinks, smoothies, shakes),
- Nutrition bars
- Meat products
- Texturized products in meat replacements products
- Edible films
- Soup products

Functionality of Pulse Proteins

- Water Holding Capacity (WHC)
- Oil Holding Capacity (OHC)
- Foam Capacity (% volume increase)
- Foam Gelation
- Gelatin

| Protein | Water Holding Capacity (WHC) | Oil Holding Capacity (OHC) | Foam Capacity (% volume increase) | Foam Gelation | Gelatin
|------------|-----------------------------|---------------------------|----------------------------------|--------------|--------
| Desi protein isolate (94.4%) | 2.6–3.4 g/g | 2.08–3.75 g/g | 30.4–44.3% | Least gelation |        |
| Kabuli protein isolate (84.8%) | 2.4 g/g | 3.80 g/g | 452–453% | Least gelation |        |
| Lentil protein isolate (54.4%) | 2.4 g/g | 3.80 g/g | 452–453% | Least gelation |        |
| Lens culinaris protein isolate (54.4%) | 2.4 g/g | 3.80 g/g | 452–453% | Least gelation |        |
| Cicer arietinum protein) | 4.9 g/g | 2.0 g/g | 63.7% |        |
| Crude Protein (Dry basis-whole seed) | 4.9 g/g | 2.0 g/g | 63.7% |        |
| Crude Protein (Dry basis-whole seed) | 4.9 g/g | 2.0 g/g | 63.7% |        |

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