Pulse Processing

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Benefits of Pulses

- High in protein, non digestible starches and fiber.
- Amino acid profile
- Contain important:
  - Omega 3 and 6 fatty acids
  - Minerals
  - Vitamins
- Health beneficial bioactive components such as
  - Fiber
  - Bioactives, proteins and peptides, phenolic metabolites
  - Low GI ingredient
Limitations of Pulses

- Antinutrients
  - Lectins
  - Trypsin inhibitors
  - High Phytic acid
  - Polyphenols
- Oligosaccharides
- Beany flavours
- Long soaking and cooking times.
- Hard to cook phenomenon
World Pulse Production

(FAOSTAT)

Millions of Tonnes

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csu.edu.au/research/fgc
New Product Releases Per Year Containing Pulse Ingredients In China and Europe

Source: Agriculture and Agri-Food Canada (AAFC):
- Innovation Series - New Products Containing Pulse Ingredients In China.
- New Food Products with Pulse Ingredients Launched in the European Union
Current Pulse Processing

Inclusion to enrich other foods, bread, biscuit, breakfast cereals, meat based products, free meat products

Ready to eat and convenient foods
Snack bars, Chips, Dips
Quick cook, precooked

Functional ingredients:
High protein, high fibre, treated flours (roasting), seed coat (fibre), high bioactivity, low GI, Reduced FODMAP

Milling to Flour, Deoderising, Blending

Cooking, Flaking/Rolling, Puffing, Roasting, Frying, Extrusion

Germination, Fermentation, Dehulling, Fractionation by wet methods, solvents (aqueous and organic), air classification

Great Protein
Low GI
No Anti’s
Improve shelf life
Great taste

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Traditional Pulse Products

• Whole pulses, Dry whole, Precooked/canned,
• Splits/Dhal, (Soups, home cooking)
• Milled Pulses: Raw flour, Cooked Flour, Grits, Meal/kibble, Flakes,
• Fractionation: Protein powder, Starch powder,
North American Pulse Processors
Ingredient Value Adding Capability

Source: Membership of Pulse Canada, Northern Pulse growers Association
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Australian Value Added Pulse Products

Source: Coles online, Leda, NotNuts
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Future opportunities

Expansion of Functional Nutrition Products

• High protein foods
• Protein modification ingredient,
• Functional proteins
• High fibre foods
• Gluten free foods
• Meat free foods/ Vegan
• Low GI foods

Functional proteins

• Improve pulse protein physicochemical functionality to compete with soy protein as a texturized protein.
• Nutraceuticals e.g. protein hydrolysates,
Pulse Processing Challenges

- **Image** Poor mans food vs Superfood
- **Culture** niche -> staple
- **Limited choice** of affordable specialised ingredients
- **Different physicochemical** properties to wheat and corn
- **Limited technological information** on pulse functionalities
- **Application** of pulses to existing processing equipment
- **Education** pulse processing properties
- **Optimisation of technology**
- **Processing cost** effectiveness: less waste + more value
- **Improve** nutritional benefits
- **Minimise** anti nutritional and beany flavors.
Future work

• Lab scale cooking and evaluation of properties: glass transition, gelatinisation.
• Cooking of pulses with pilot scale pressure cookers and kiln cookers.
• Pilot scale flaking of pulses for inclusion in breakfast cereals as whole food or quick cook ingredient.
• Blending of pulses for extrusion.
• What happens to nutrients and anti nutrients in these processes?
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