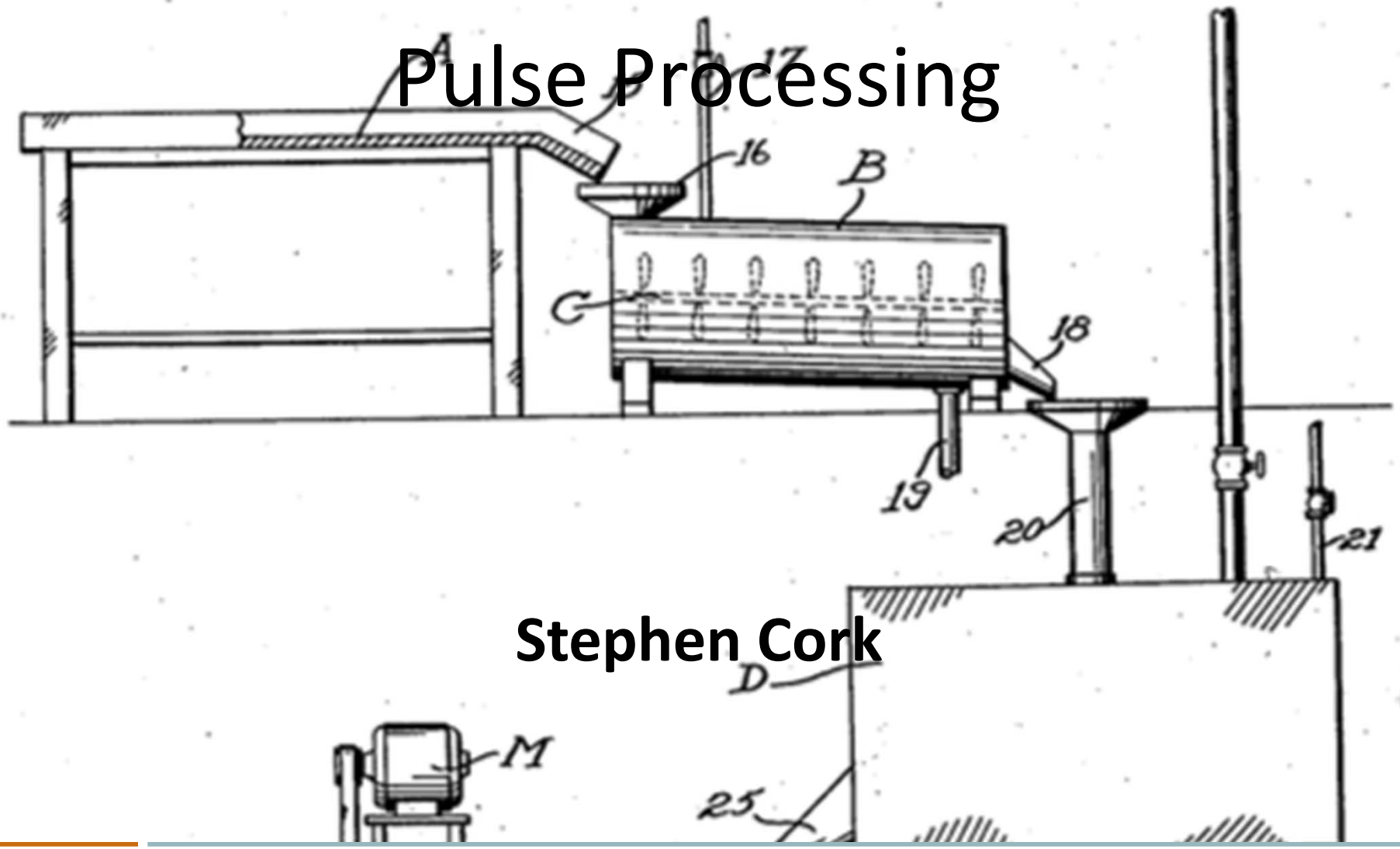
July 7, 1931. F. R. BACHLER 1,813,268

PROCESS OF MAKING LEGUMINOUS FLAKES

Filed Aug. 1, 1927

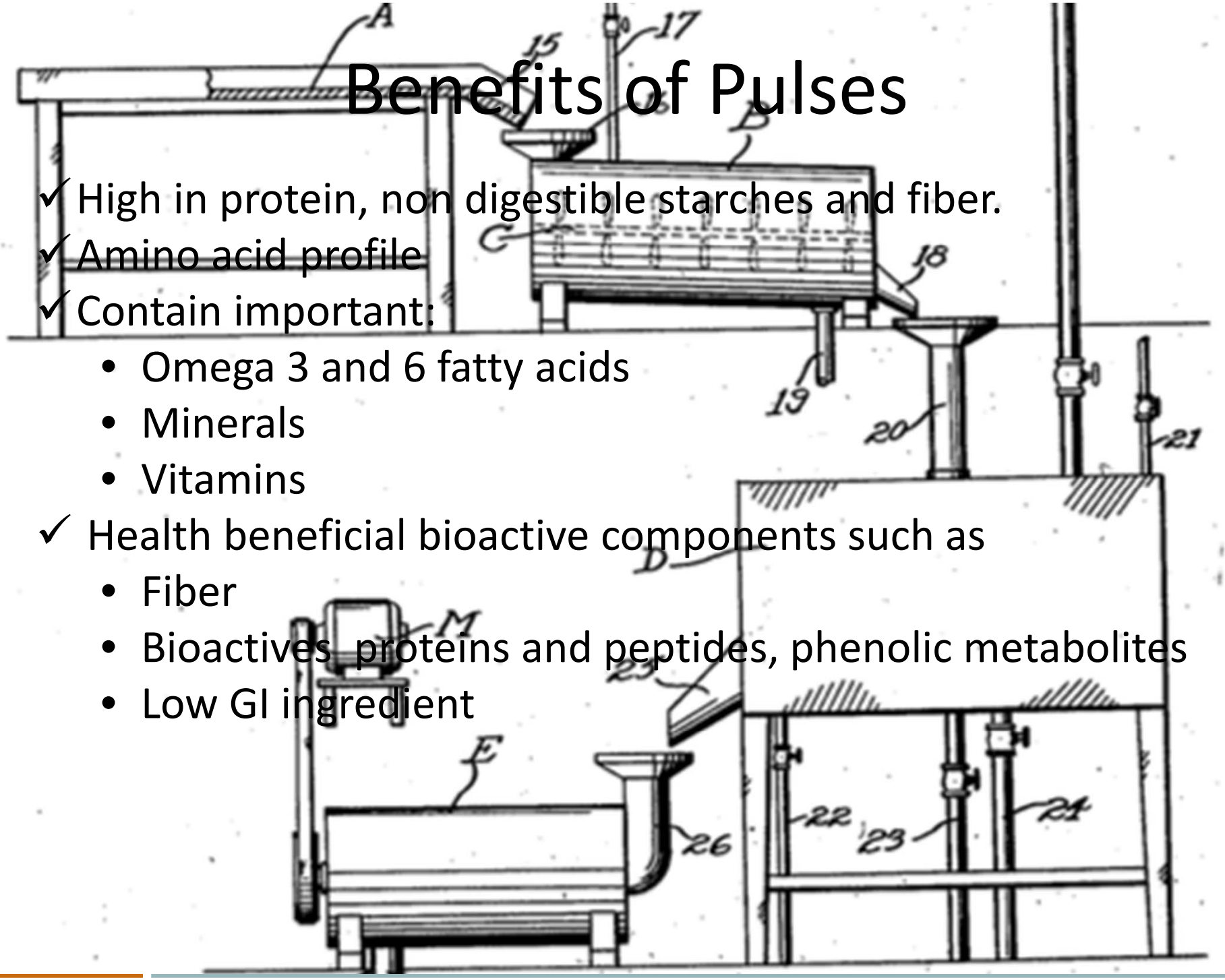
Pulse Processing



Stephen Cork

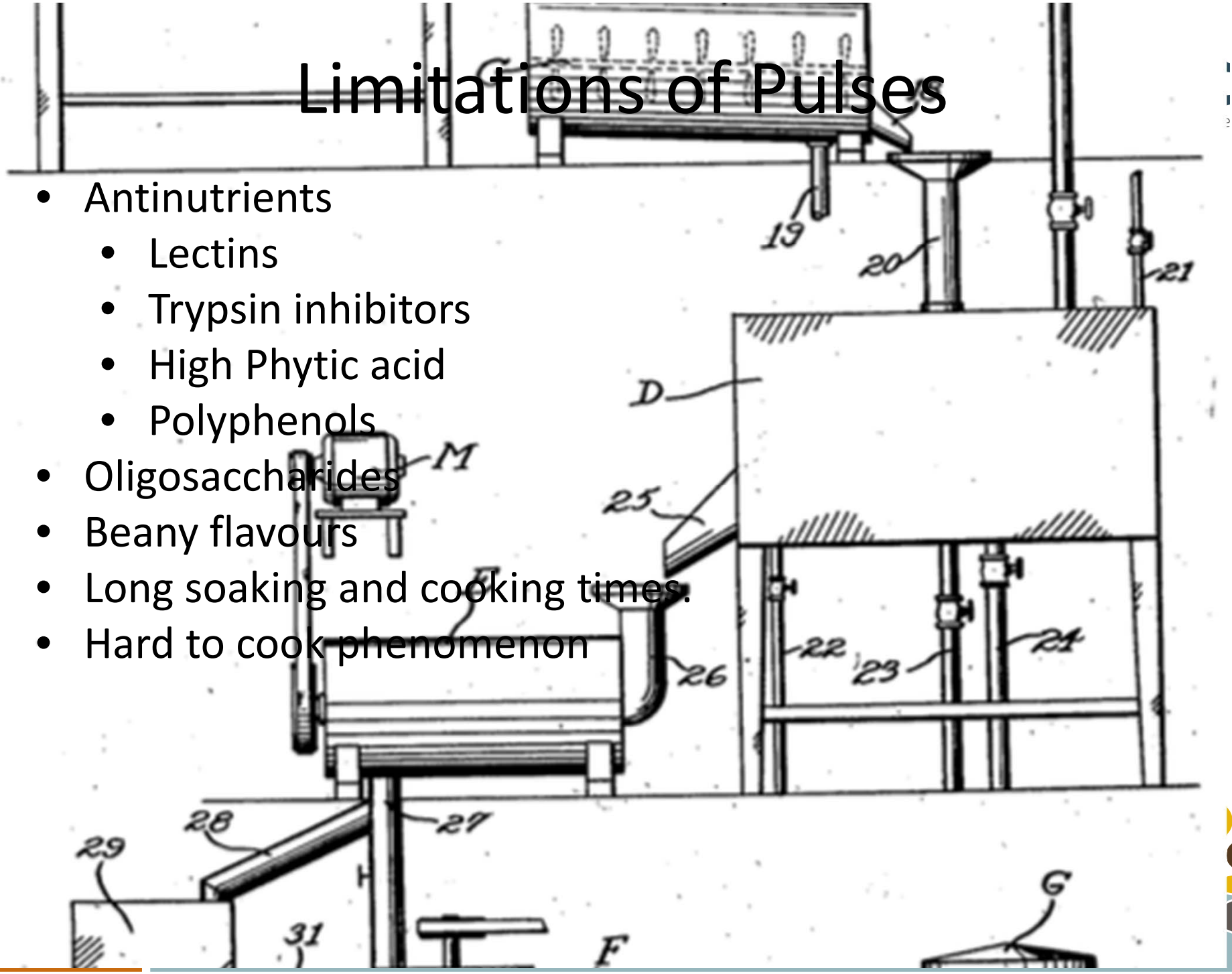
Benefits of Pulses

- ✓ 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



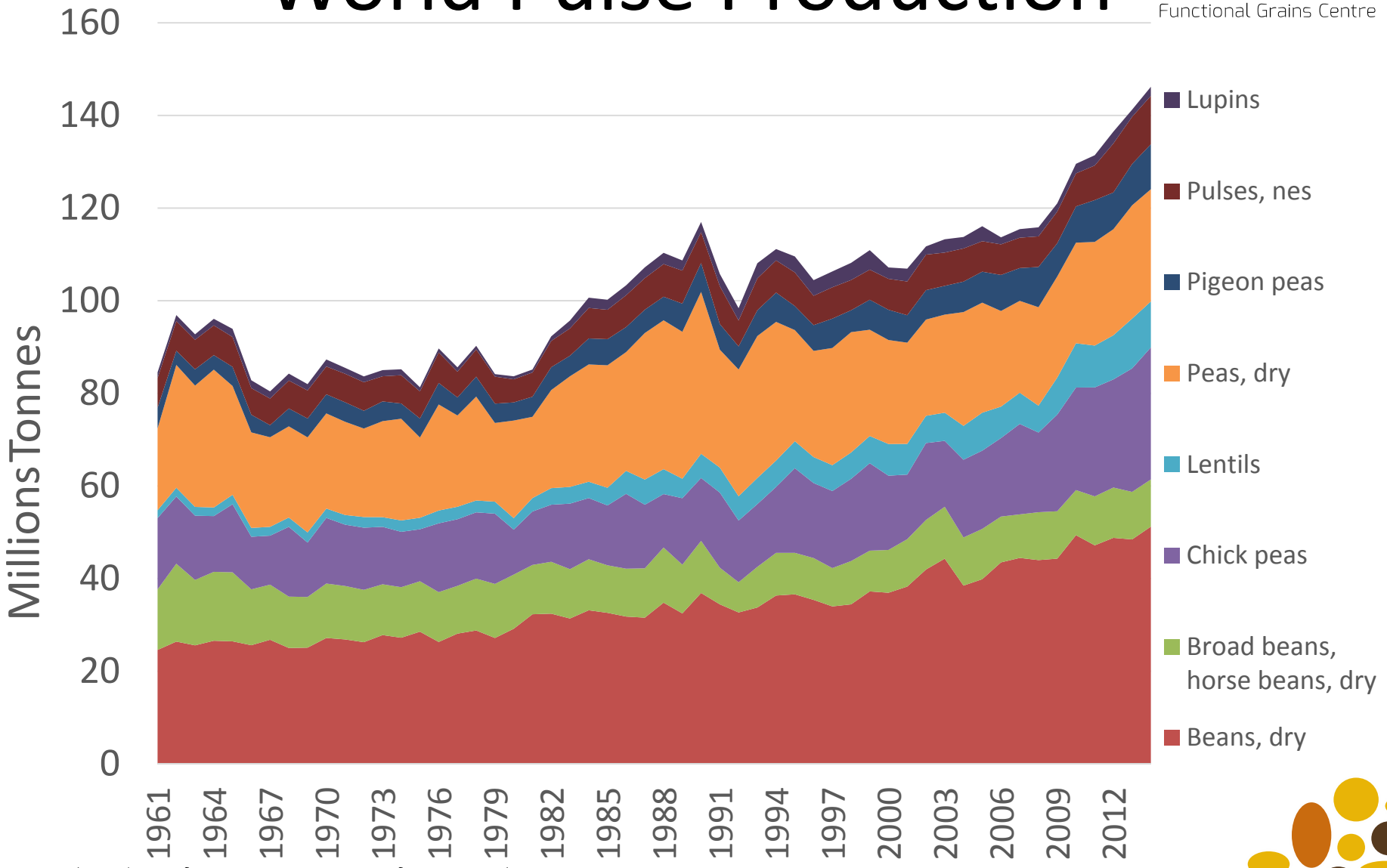
Limitations of Pulses

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



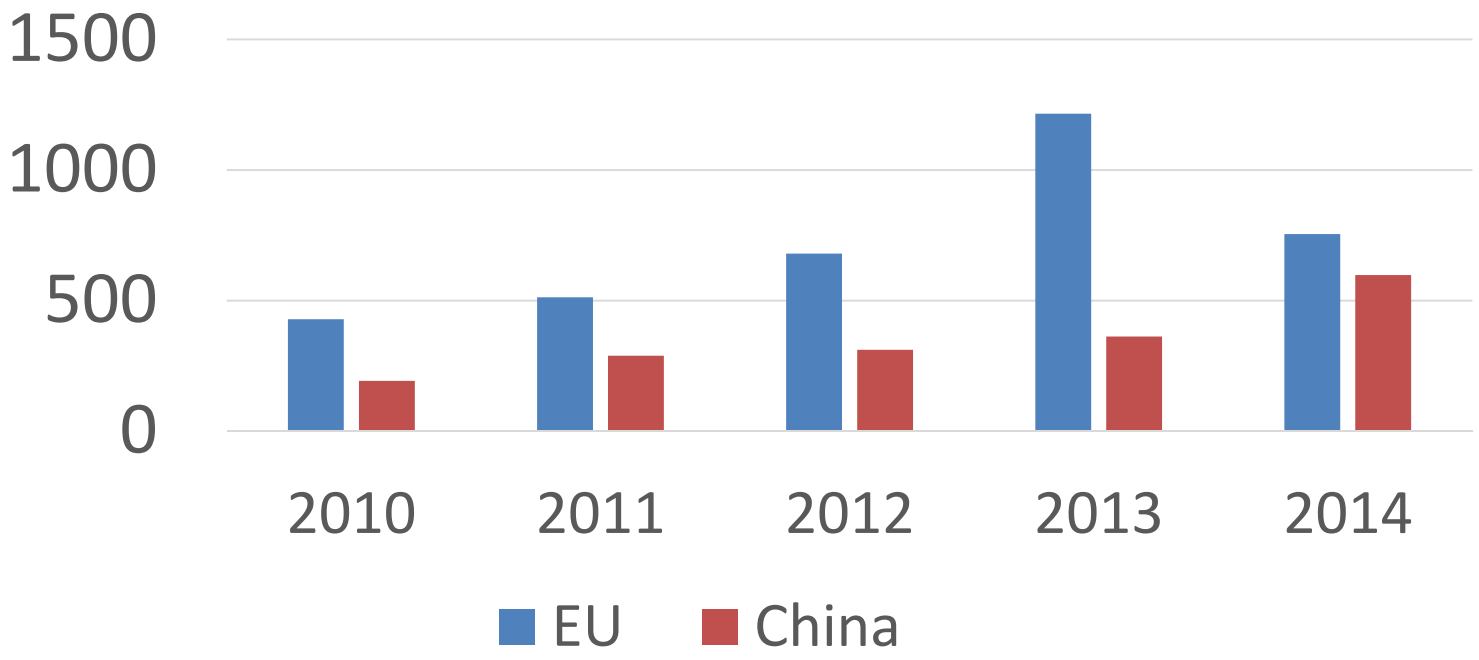
(FAOSTAT)

World Pulse Production



FGC
Functional Grains Centre

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

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Milling to Flour, Deoderising, Blending

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

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

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

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

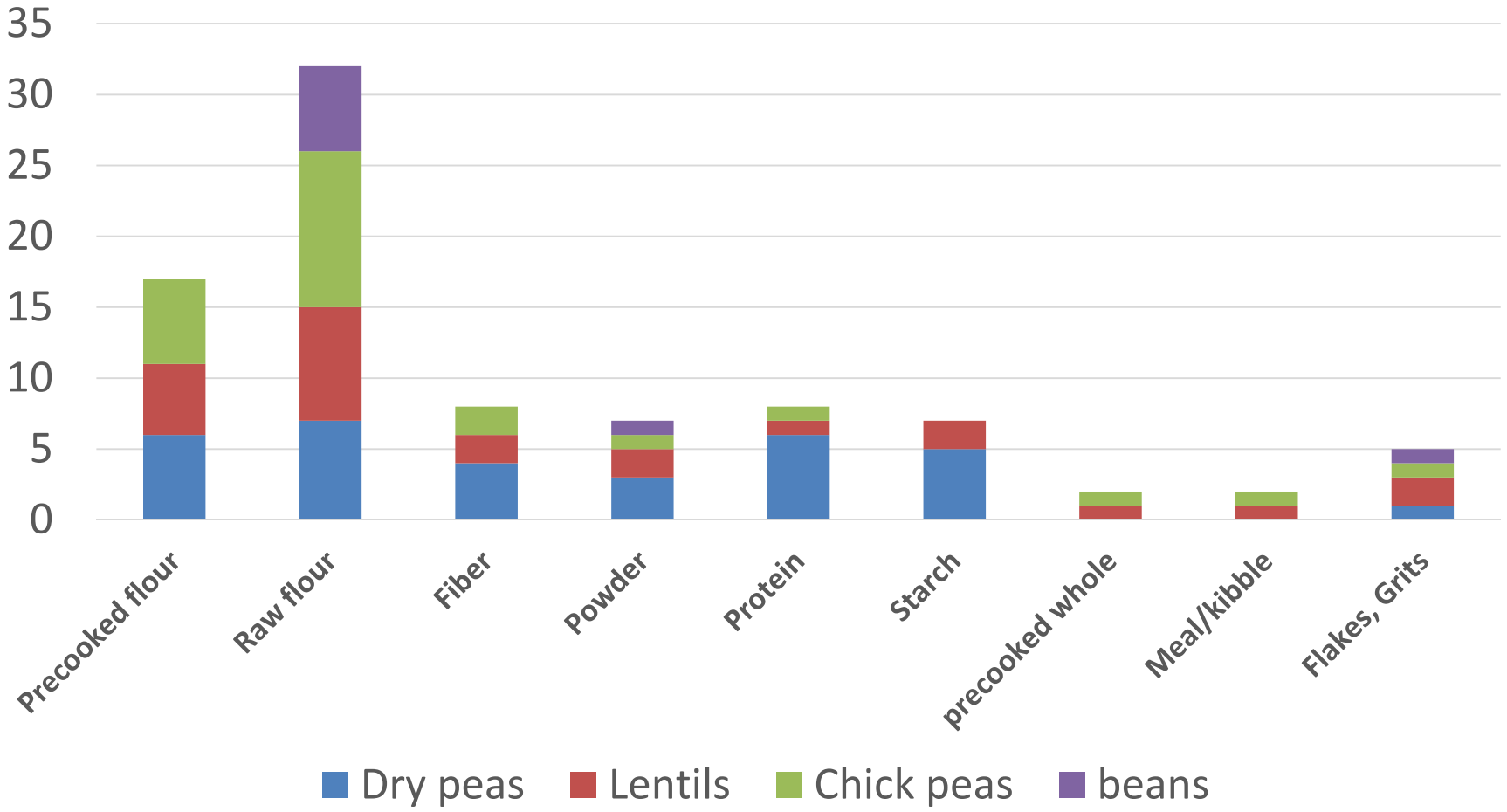
Functional ingredients:
High protein, high fibre, treated flours (roasting), seed coat (fibre), high bioactivity, low GI, Reduced FODMAP

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,

Photos:Woolworths, Wikimedia

North American Pulse Processors Ingredient Value Adding Capability



Source: Membership of Pulse Canada, Northern Pulse growers Association

Australian Value Added Pulse Products

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Source: Coles online, Leda, NotNuts

Future opportunities

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Expansion of Functional Nutrition Products

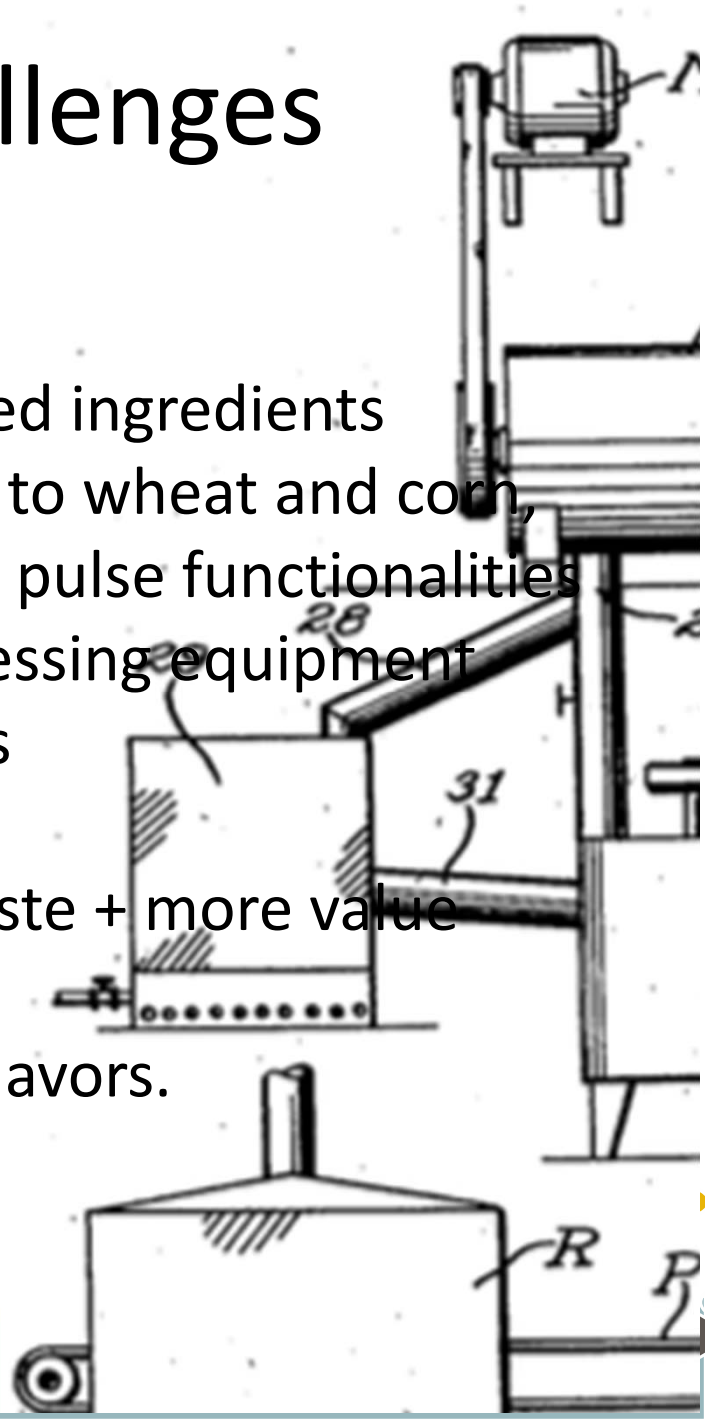
- High protein foods
- Protein modification ingredient,
- Functional proteins
- High fibre foods
- Gluten free foods
- Meat free foods/ Vegan
- Low GI foods

Functional proteins

- Improve pulse protein physicochemical functionality to compete with soy protein as a texturized protein.
- Nutraceuticals e.g. protein hydrolysates,

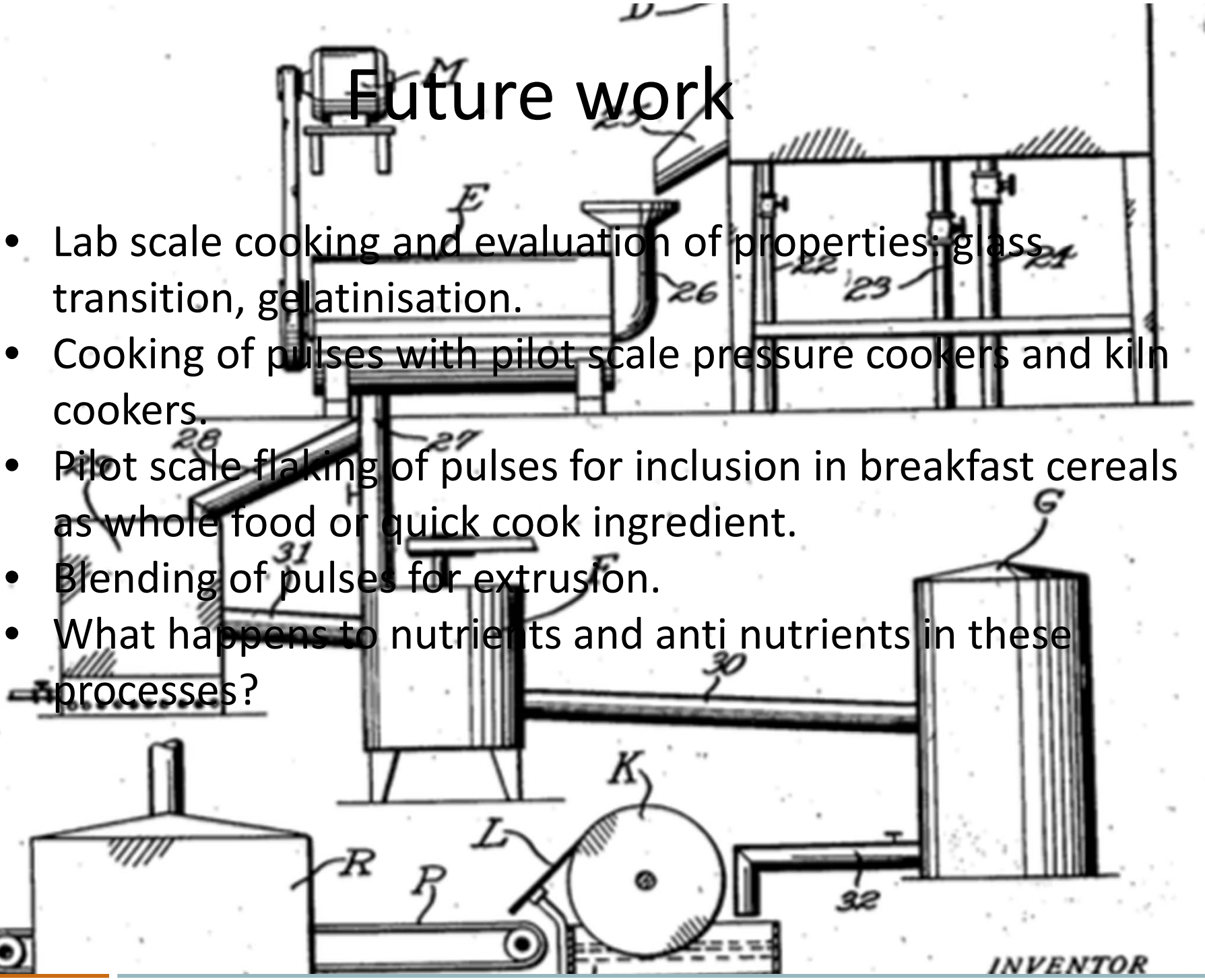
Pulse Processing Challenges

- **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?



Acknowledgements

Australian Research Council – Industrial Transformation Training Centre (ITTC) Scholarship

Industry partner Woods Foods

Supervisors

Professor Christopher Blanchard.

Dr Asgar Farahnaky, Professor John Mawson