Canola Protein – The New Kid on the Block

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DSM at a glance

Sales*	Global* presence	Listed at Euronext NYSE	Sustainability leader
>10 billion	~25,000 employees worldwide	Share price ~ quintupled in 25 years	Top ranking Dow Jones Sustainability Index

- **Global Life Sciences and Materials Sciences company** active in health, nutrition and materials
  - Leading supplier of vitamins, omega's, carotenoids, nutritional ingredients, premixes and nutritional solutions for human and animal nutrition & health
- Delivering **innovative sustainable solutions** that nourish, protect and improve performance in global markets
- **Sustainability** is a core value and an important business driver

* Including 2015 pro-forma and pro-rata (annualized) sales & number of employees (ultimo 2015) of non-consolidated Associates & Joint Ventures (for sales this is mainly Patheon, DSM Sinochem Pharmaceuticals and ChemicalInvest)

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Consumer and market demand increasing for alternative protein sources

Healthy

Sustainable

Natural

Hypoallergenic

Chemical free

Non-GMO

Non-meat alternatives

Solution:
Plant based proteins

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Consumer and market demand increasing for alternative protein sources

Plant Proteins - Unmet Needs

- Taste - flavor (beany, bitter)
- Taste - mouthfeel (powdery, gritty)
- Solubility (limited or partly soluble)
- Serving low pH applications

Hypo

nical free

Non-GMO

Non-meat alternatives

Solution:
Plant based proteins

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Canola/Rapeseed

Today

- Canola is grown for the production of vegetable oil and animal feed
- Worldwide it is the 3th leading source of oil after palm and soy
- Canola meal, today used exclusively as animal feed, contains around 40% protein

The Challenge

- **Efficient removal of anti-nutritional components:** glucosinolates (mustard taste), polyphenols (bitterness & browing), and phytate

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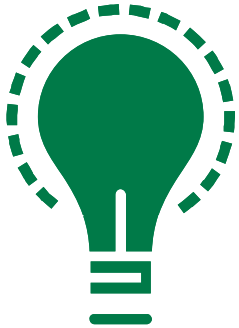
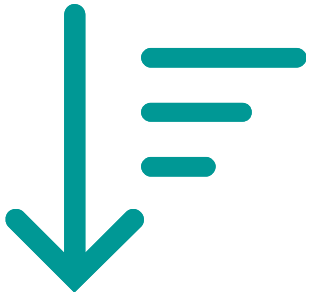
Overcoming the challenge ➔ creating a viable, canola protein with patented DSM technology

Mild processing and efficient separation

Mild pressing to ensure a native protein



A novel method to extract protein from oil seeds without extracting high amounts of oil



Efficient removal of anti-nutritional components yielding a high quality isolate

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CanolaPRO, DSM's Canola protein

Exceptional characteristics and functional properties

General

- Non GMO
- Non Solvent
- Non Gluten

Functional

- **Bland/neutral taste**
- **High solubility, also at low pH**
- High foaming and emulsifying capacity

Nutritional

- PDCAAS = 1
- DIAAS >1

CanolaPRO

Component	Spec
Protein Kjeldahl N= 6.25	> 90%
Fat	< 2%
Ash	< 4%
Carbohydrates	< 7%
Phytate	< 1.5%
Glucosinolates	< 1 µmol/g
Phenolics	< 1000 ppm

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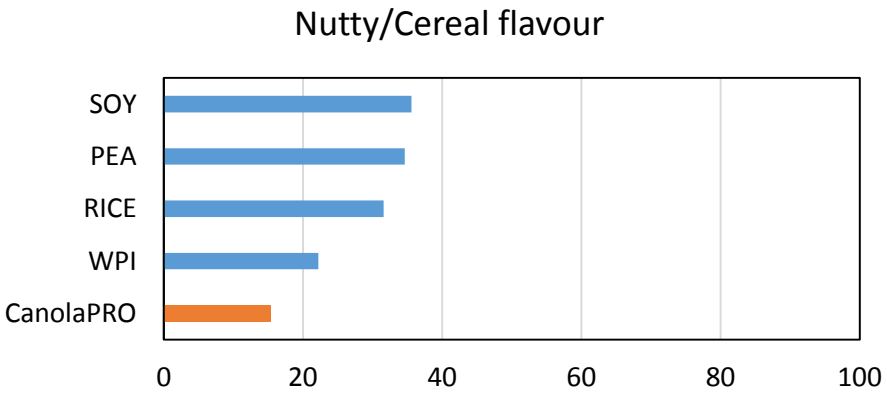
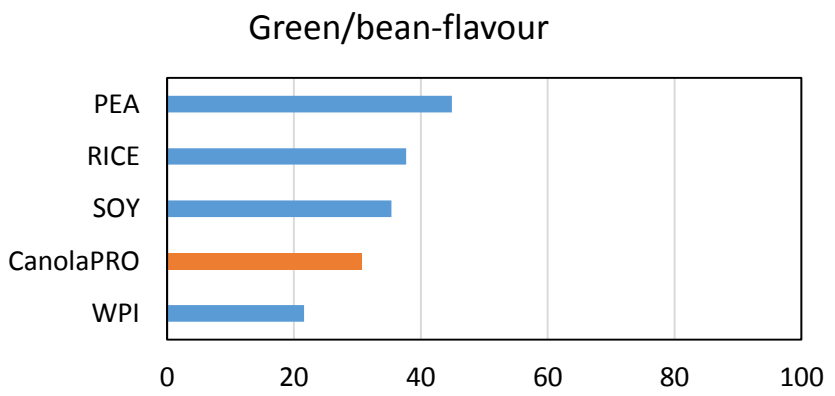
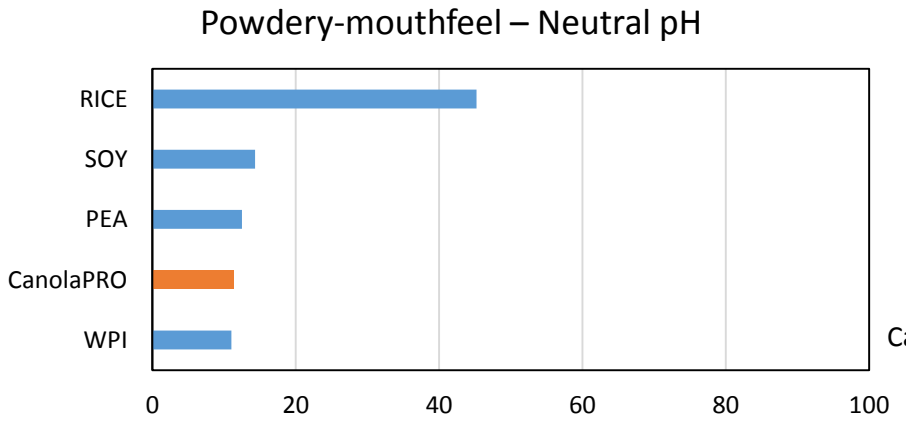
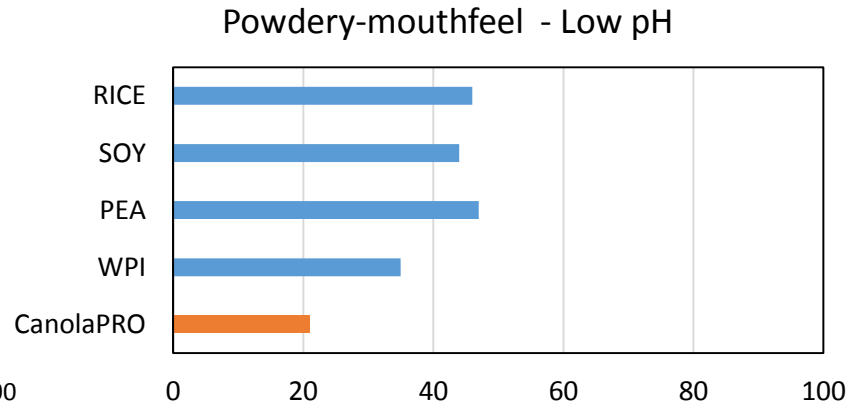
Sensory CanolaPRO

Good flavor profile









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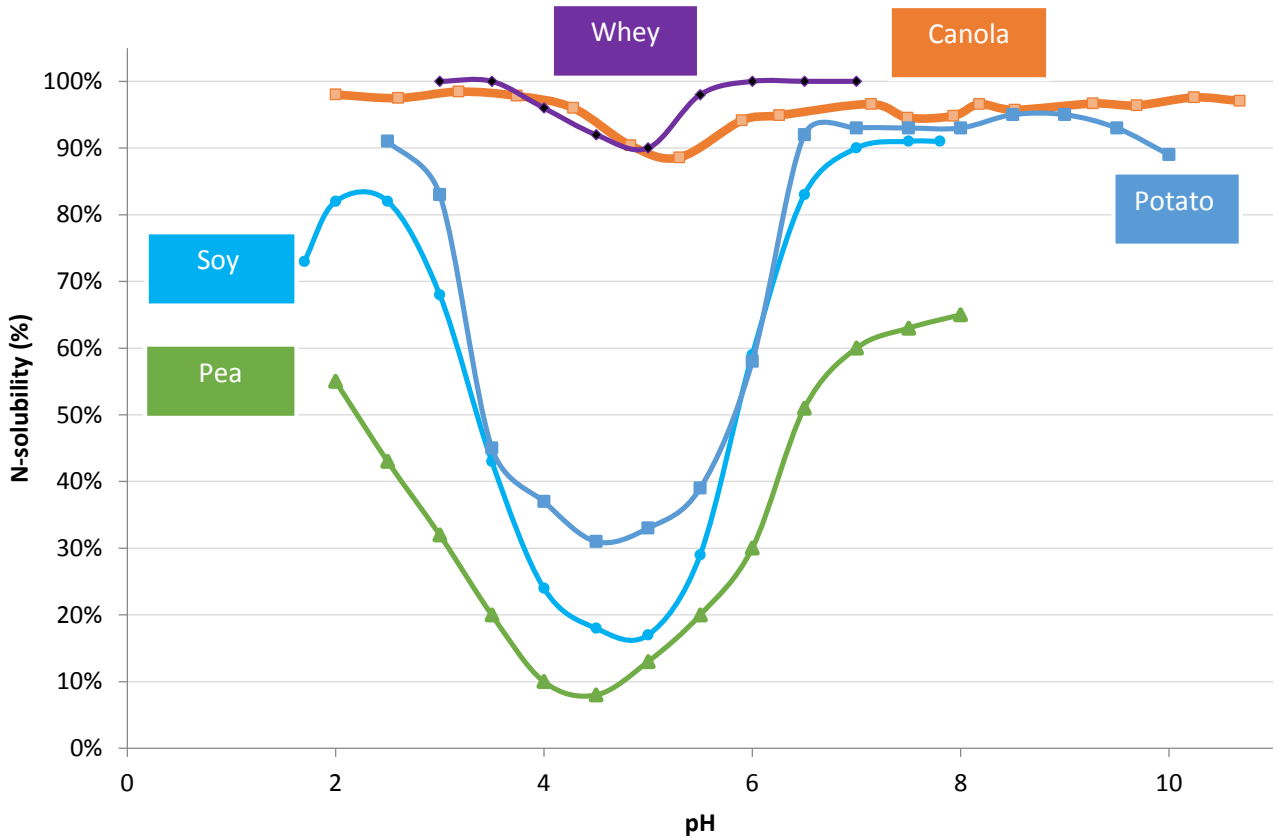
Protein Solubility CanolaPro

Unique plant protein: highly soluble over a broad pH range



Protein Solubility RPI90 vs. alternative plant proteins
(Info from open sources)

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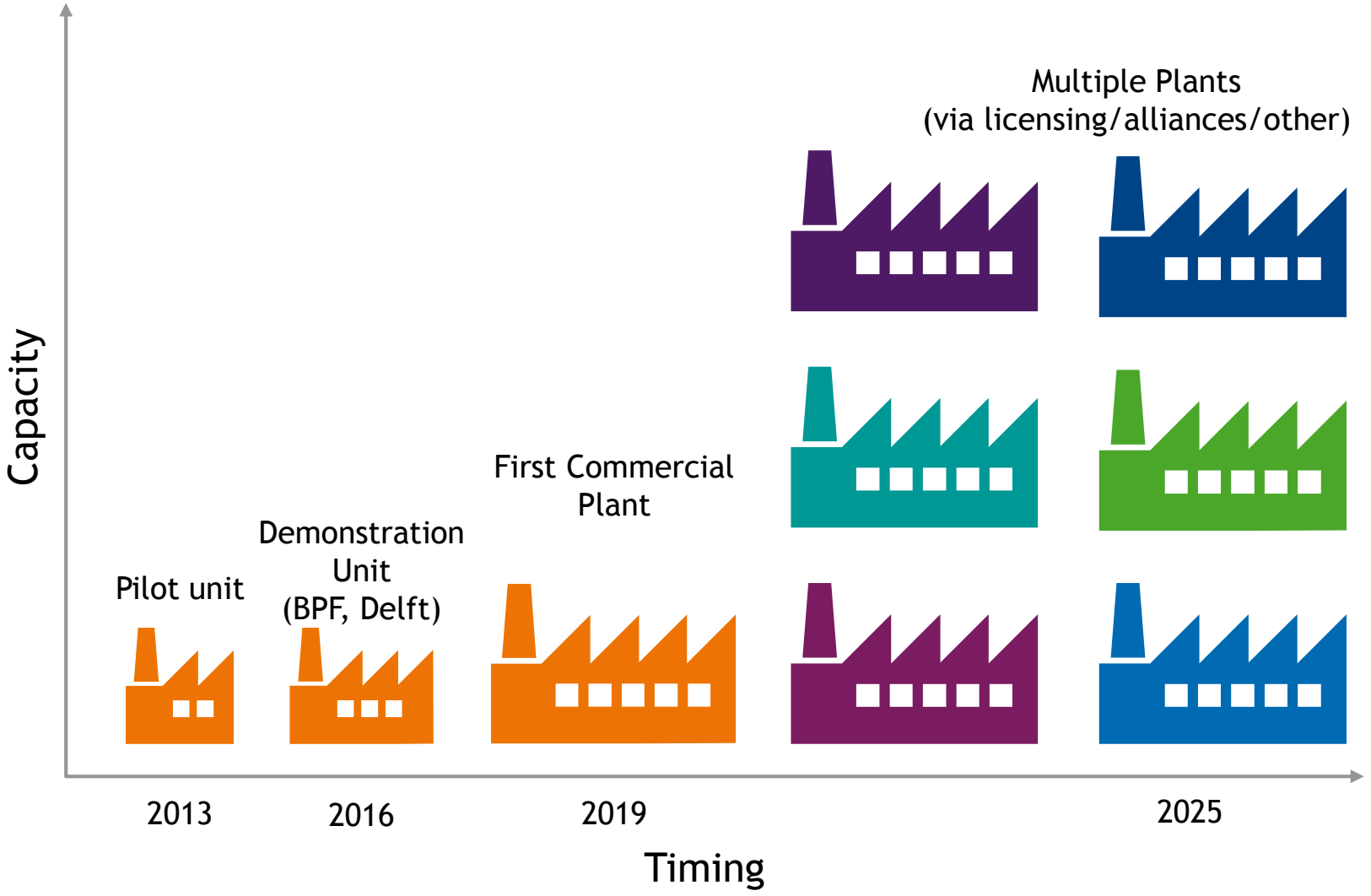
A stepwise commercialization approach to mitigate technological and market risks



Canola Protein
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CanolaPRO. No compromise.

Canola | Dairy/whey | Egg | Soy | Pea | Wheat | Potato | Rice

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