

Intrinsic – Integrated sustainable processing of oil and functional protein from oilseeds

5-year project (start: 2022), both fundamental and applied research

26-09-2023, Peter Geerdink, Aard de Jong, Wim Mulder



Two partners

Wageningen University & Wageningen Research

Wageningen University

- 13,108 BSc/MSc-students from
- 2,389 PhD candidates
- 3,940 staff (3,415 fte)
- Revenue in 2022: € 458 million

Wageningen Research

- 3,662 staff (3,327 fte)
- Revenue in 2022: 394 million

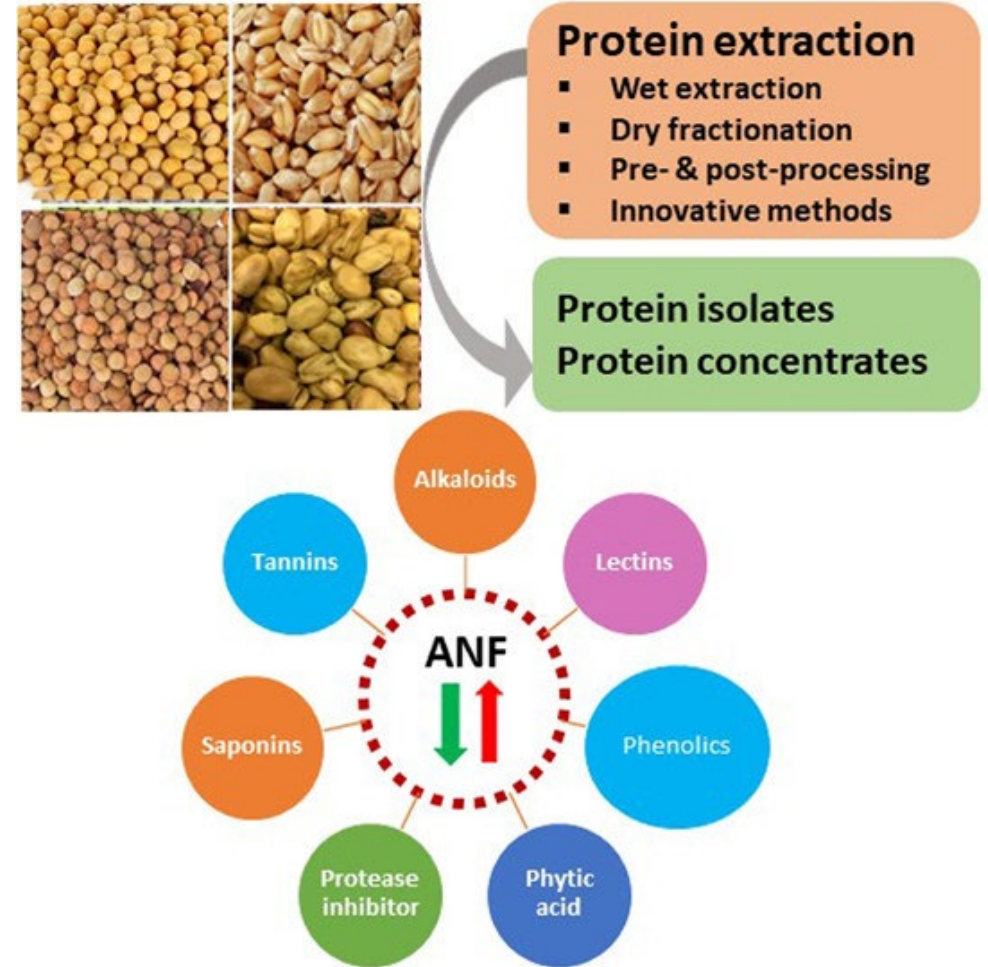


Project partners

- **Foss:** Developer of analytical equipment. Creates end-to-end solutions that secure and improve food quality (Denmark)
- **Cano-Ela:** Startup developing a novel, solvent free process to extract less refined ingredients from oilseeds (Netherlands)
- **Riverina:** Vertically integrated, bulk canola oil supplier, located in NSW, Riverina region (Australia)
- **Valtris/Champlor:** Processor of rapeseed from regional sources (France)
- **Danone:** Global company in dairy and plant-based products, early life and medical nutrition and waters (Netherlands)
- **Wageningen UR:** University and research institute in the field of agriculture and life sciences (Netherlands)
- **Project sponsored by the Dutch government (TKI financing)**

Background

- Oilseed residues are the largest global source of protein, mostly used as feed.
- Protein from oilseed has a huge potential impact as a food ingredient.
- Challenges:
 - Extractability of protein after oil extraction
 - ANF's and residues in the protein product
 - Optimization of protein yield combined with oil yield

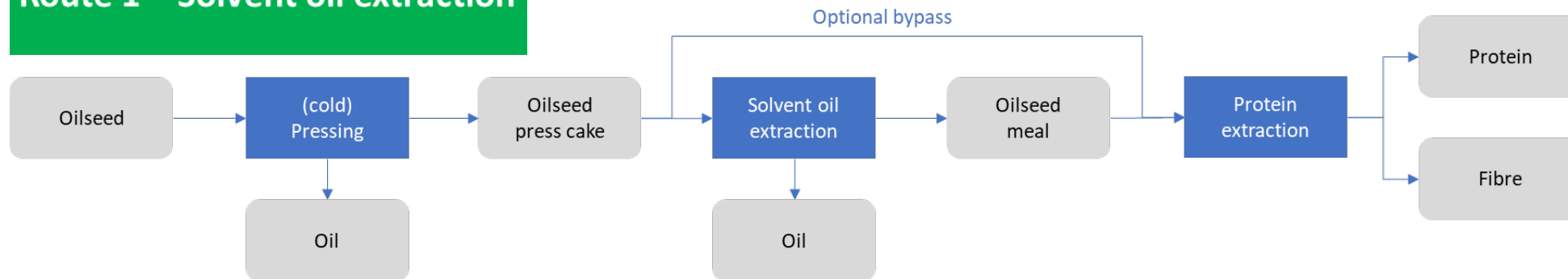


Amin *et al*, 2022

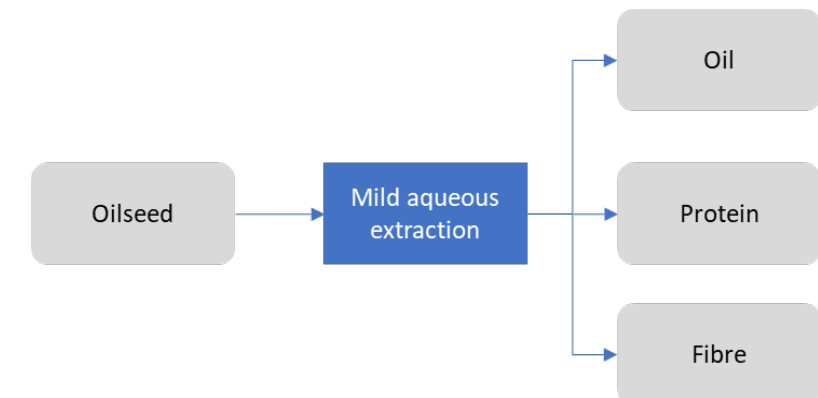
Objective

- Develop 2 routes for protein and oil production from rapeseed
 - Protein extraction of material from a conventional oil production plant
 - Protein and oil production via novel aqueous protein and oil production route

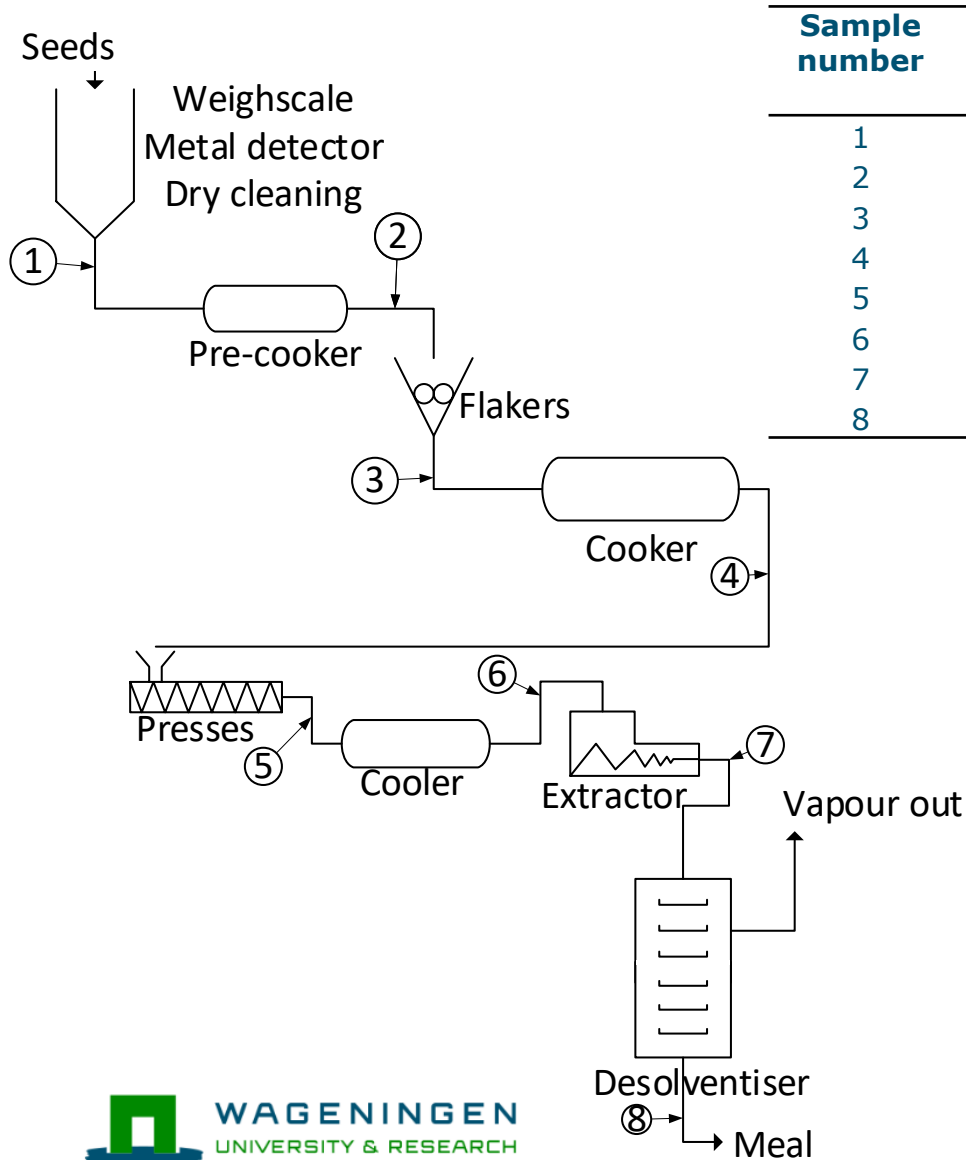
Route 1 – Solvent oil extraction



Route 2 – Novel mild aqueous oil extraction



Industrial processing and in-factory sampling



Sample number	Name	Dry weight (%)	Protein content (%)
1	Inlet	93.1	18.6
2	Pre-cooker	94.1	18.2
3	Flaking	94.3	17.7
4	Cooker	96.0	18.6
5	Press	92.9	26.5
6	Cooling	95.3	26.6
7	Extractor	90.7	33.8
8	Toasting	90.1	34.0

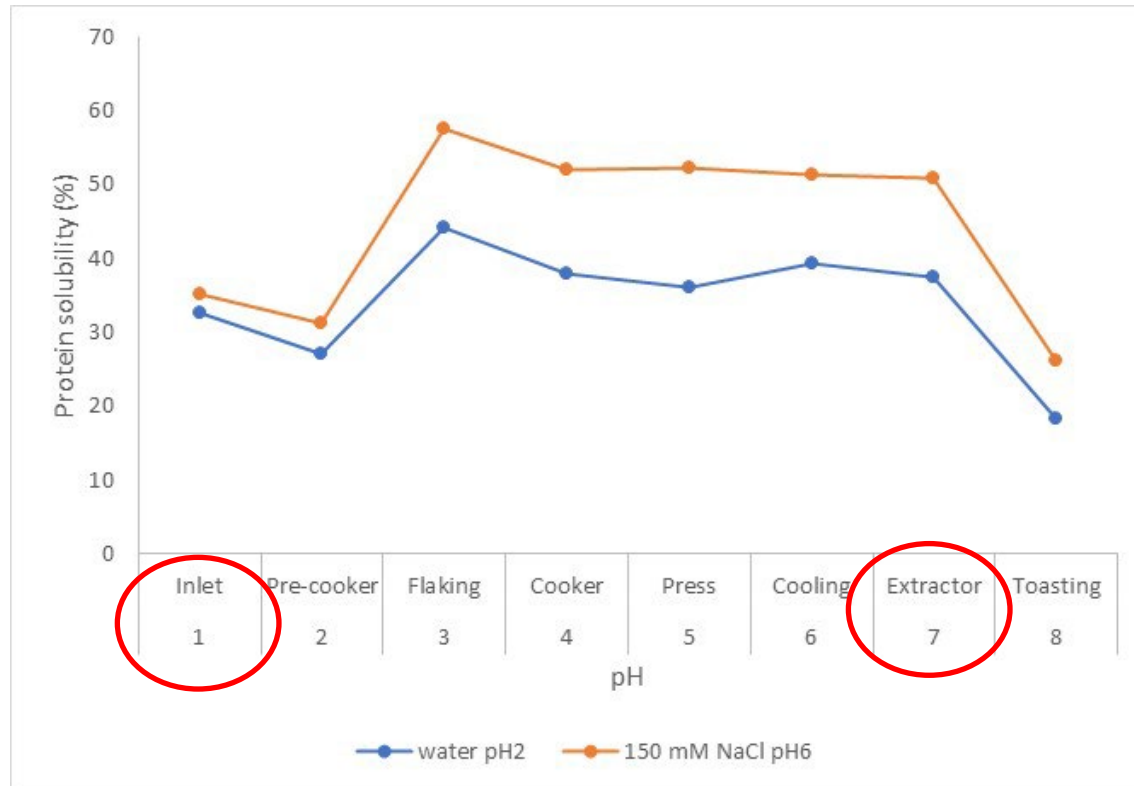


Site: Valtris/Champlor, Verdun, France



Process-product interaction

- Protein solubility influenced by industrial processing

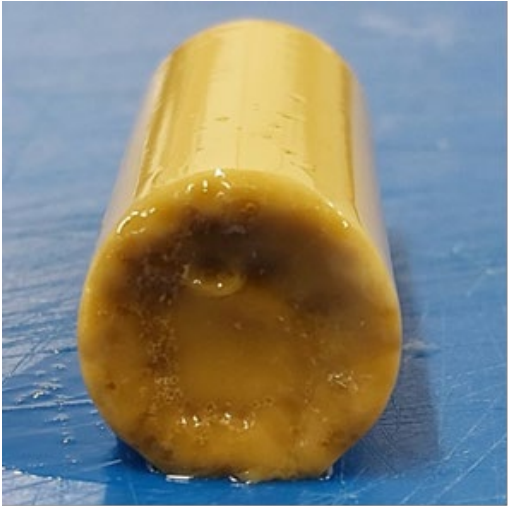
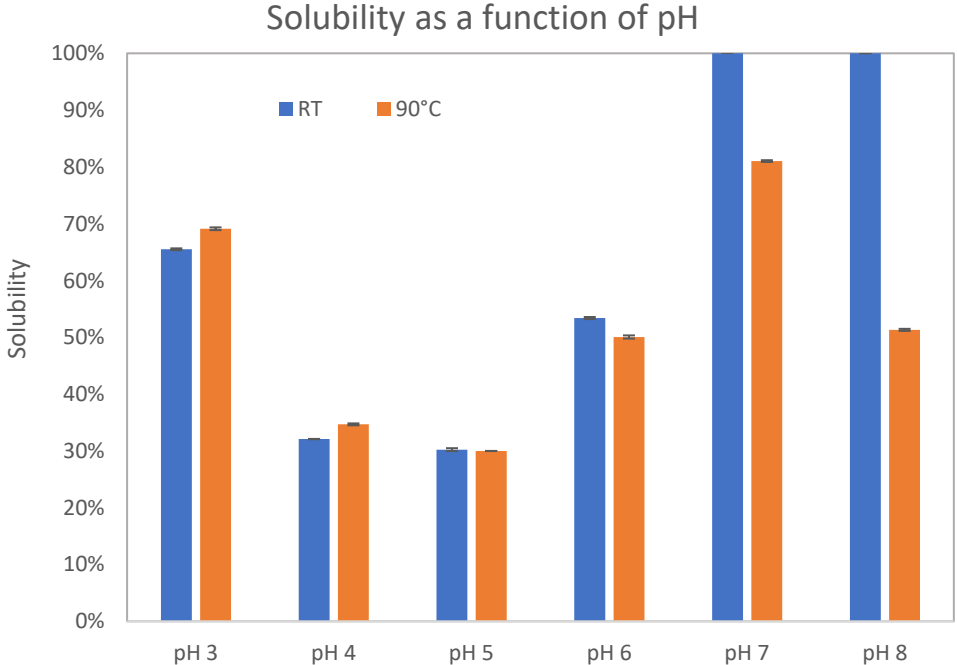


○ = samples analyzed at varying pH

Sample 7 starting material for extraction

Results

- Small scale napin extraction
 - 82% protein purity, napin yield 50%
- Functional properties:



pH 8
Self-supporting
gel



Future research

- Scaling up napin isolation.
- Simultaneous extraction of cruciferin
- The removal of anti-nutritionals in the process will be assessed
- NIR methodology will be developed to analyse functional properties in the samples.
 - Create a predictive method to provide insight in protein properties



Thank you for your attention

Project team:

- Brigit Beelen
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- Sybren Zondervan
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- Marieke Schenkel
- Willemijn Liese

