

NIZO High Throughput Protein Extraction Tool

FINALIST - Future Foodtech Innovation Award
Fi Innovation Award 2024

A hand holding a small pile of green peas, with a blurred bowl of peas in the background. The text 'INNOVATING TOGETHER' is overlaid on the bottom right of the image.

INNOVATING
TOGETHER

Introduction



Sensory quality, protein content and functionality of plant-protein ingredients are of crucial importance for product performance and are mainly determined by crop, variety and production process. To fulfil the quality requirements, seed breeders develop large numbers of new varieties. While breeding is highly automated, the protein extraction and characterisation of the protein ingredients is still laborious.

NIZO made a step change by developing the automated [High Throughput Protein Extraction Tool](#) that miniaturised and automated this laborious process.

Nowadays 24 seed varieties can be extracted automatically and analysed for their protein content and composition, aroma and taste profile.

How does it work?

Step 1:
Dispersion

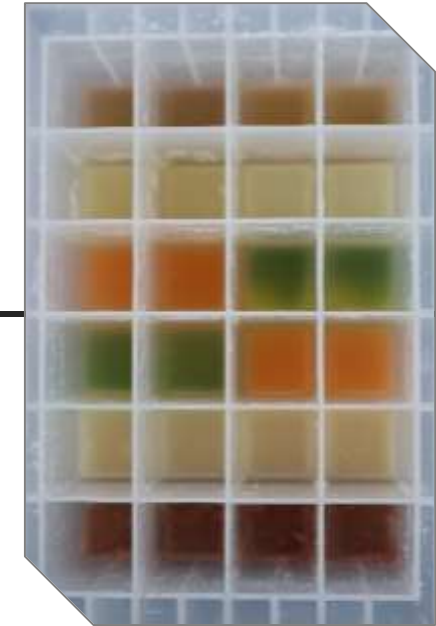


Step 2:
Extraction



Step 3:
Separation

Step 4:
Quantification



How does it work?

Step 1: Dispersion

- Meal or flour is weighted into the 24-well plate.
- Extraction buffer is added.
- Extraction buffer can be varied in composition, pH and amount.

Step 2: Extraction

- The 24-well plate is sealed and installed in the shaker.
- Extraction time, shaking intensity, and temperature can be varied.

Step 3: Separation

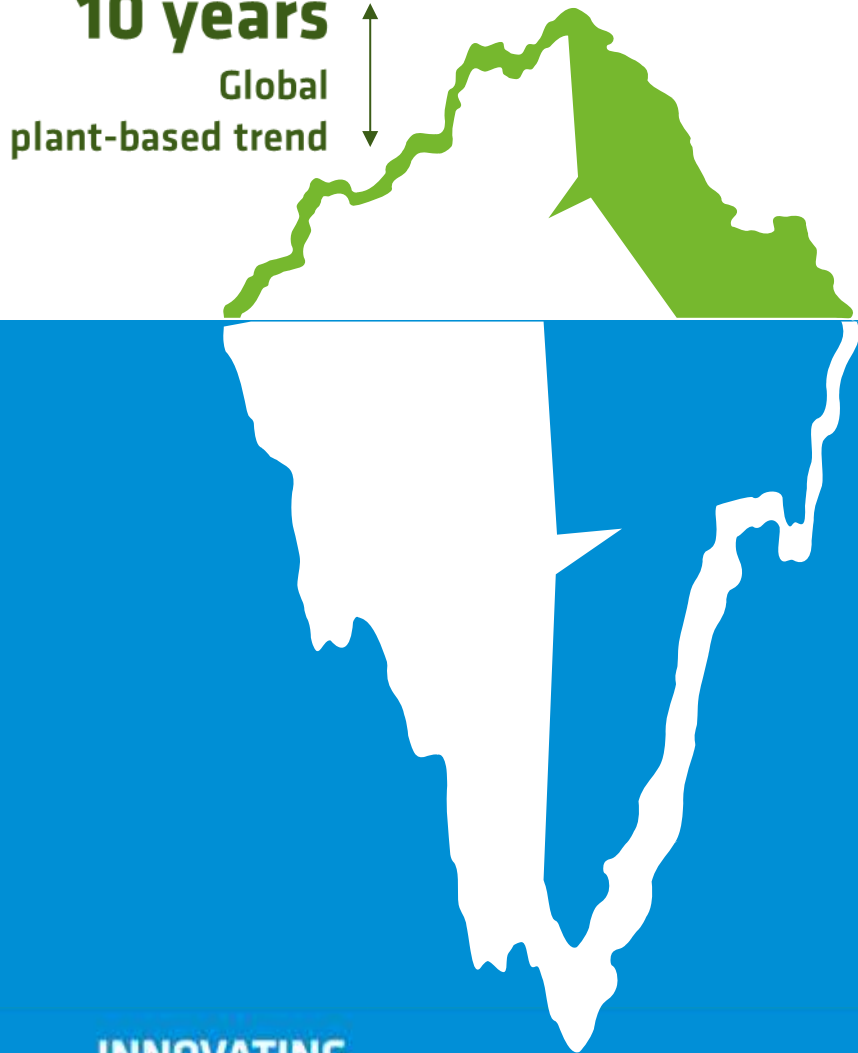
- The 24-well plate is centrifuged to separate the solids (mainly starch and fibre).
- The protein solution (supernatant) is automatically transferred to a new plate.

Step 4: Quantification

- Protein extraction yield is automatically determined by BCA analyses.
- Samples can be further processed for analysis of protein composition, volatile and non-volatile compounds.

NIZO has been conquering this 'protein-berg' for over 75 years

10 years
Global
plant-based trend



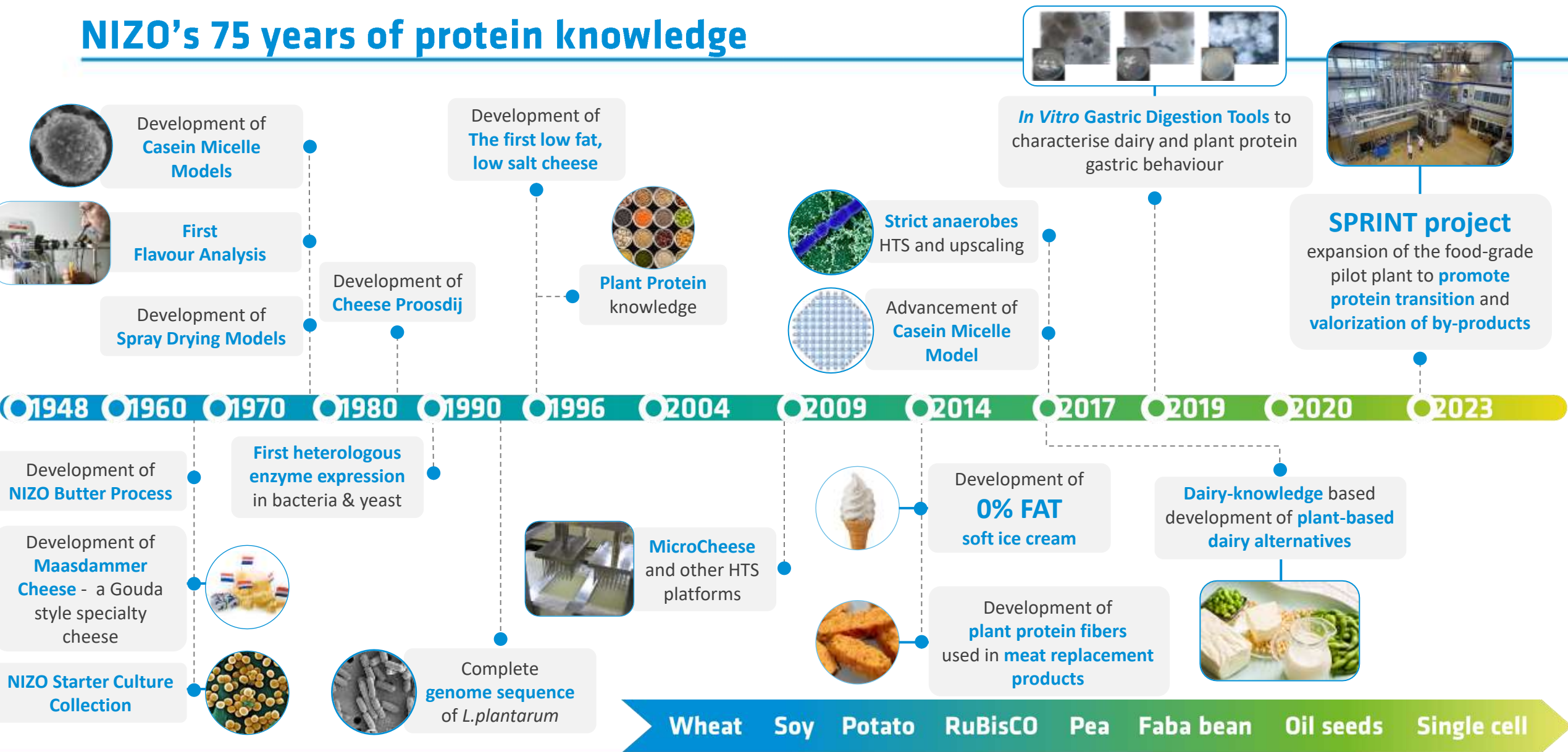
25 years
NIZO's
plant-protein research

“
*Which ingredient to use in my application?
How to process my raw material?
Can I use fermentation?*
”

75 years
NIZO's
protein knowledge

“
*How does the protein interact with other ingredients?
How is the food safety/microbial quality affected?
What is the source/origin of off flavour and taste?
Which functionality can be delivered by alternative proteins?
What is the best micro-organism and fermentation conditions?*
”

NIZO's 75 years of protein knowledge



Protein transition: current and future vegan protein sources

NIZO has hands on experience with these proteins

ESTABLISHED



Soybean



Pea



Lupine



Potato



Rice



Corn



Faba bean



Chickpea



Lentils



Oat



Almond



Wheat

EMERGING



Sunflower



Mung bean



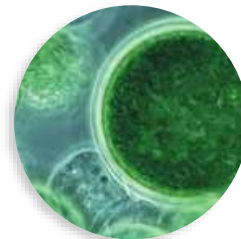
Rapeseed



Green leaves



Quinoa

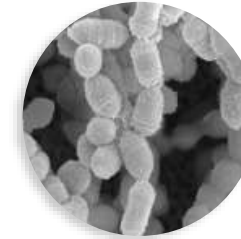


Microalgae

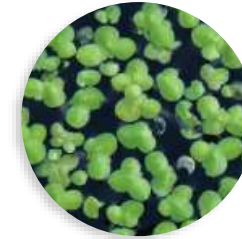
UP COMING



Nuts



Single cell/
Fermentation



Duckweed



Flaxseed



Hemp



Seaweed

Photos by Sanjay Acharya, Shihmei Barger, Kristina D.C. Hoeppe, K.R. Harsha, Luis Molinero, Stefan Malmesjö, Mirjam van de Velde and others.



For more information, please contact:

Dr. Fred van de Velde

NIZO Expertise Group Leader Protein Functionality

Fred.vandeVelde@nizo.com

+31 615908420

Thank you!



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