Nestlé Good food, Good life

Nutritional Benefits, Texture & Purposeful Processing for Plant-Based Products

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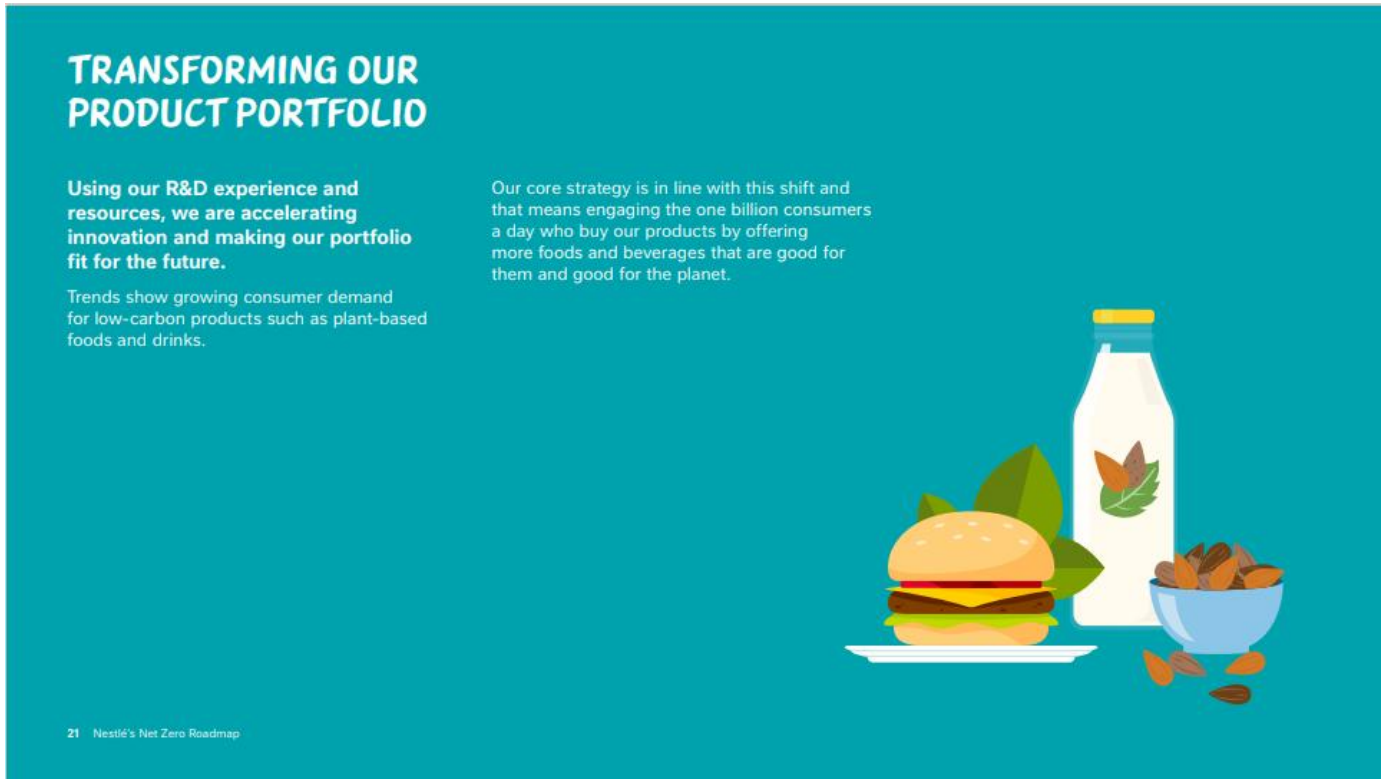
Business relevance for protein diversification at Nestlé

- Plant-based products as a key driver for reducing our carbon footprint



Research and Development

Achieving successful plant protein choice

- Combination of nutritional, technological & sustainability needs as well as consumer centricity

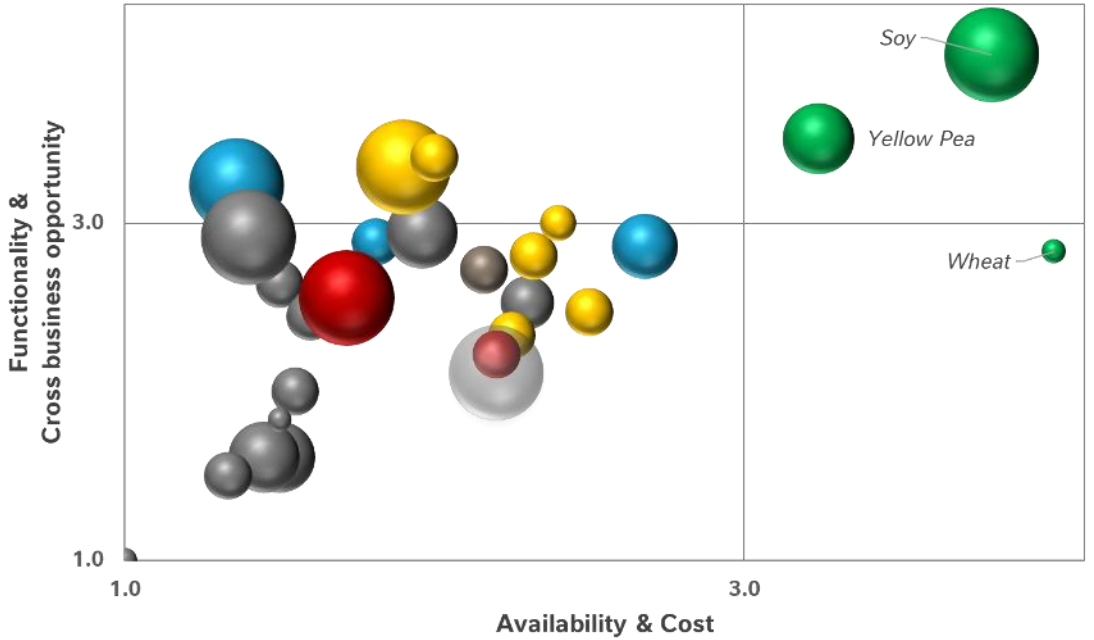
- Protein content & quality
- Nutrition & claims
- Allergenicity, intolerance
- Consumer perception
- Source (geographic, commercial)
- Historical use
- Certifications
- Availability
- Safety
- Regulatory
- Functionality
- Familiarity with use
- Cost
- Aroma, flavor, texture, mouthfeel, color

Research and Development

Nestlé is building on strong protein R&D scientific & technical expertise

- R&D Protein Scientific Network supports decision making based on objective dataset

*Bubble size: PDCAAS



Current sources

Wanasundara et al. (2024). Functionality of Plant Proteins: Properties, Methods of assessment, Modifications and Applications. Academic Press/AOCS

Research and Development

Achieving consumer preference for plant proteins

- Excelling across different attributes relevant for purchase decision

Superior environmental footprint, *e.g.* reduce carbon footprint, avoid overfishing, protect animal welfare

Taste & Aroma

Recognizable ingredients

Nutrition

Affordability

Research and Development

Nestlé product portefolio enables various formats and reaching multiple geographies and consumer categories

- Ambient formats enable reach in geographies with limited cold chain and high demand for affordable nutrition

Chilled

Ambient

Frozen

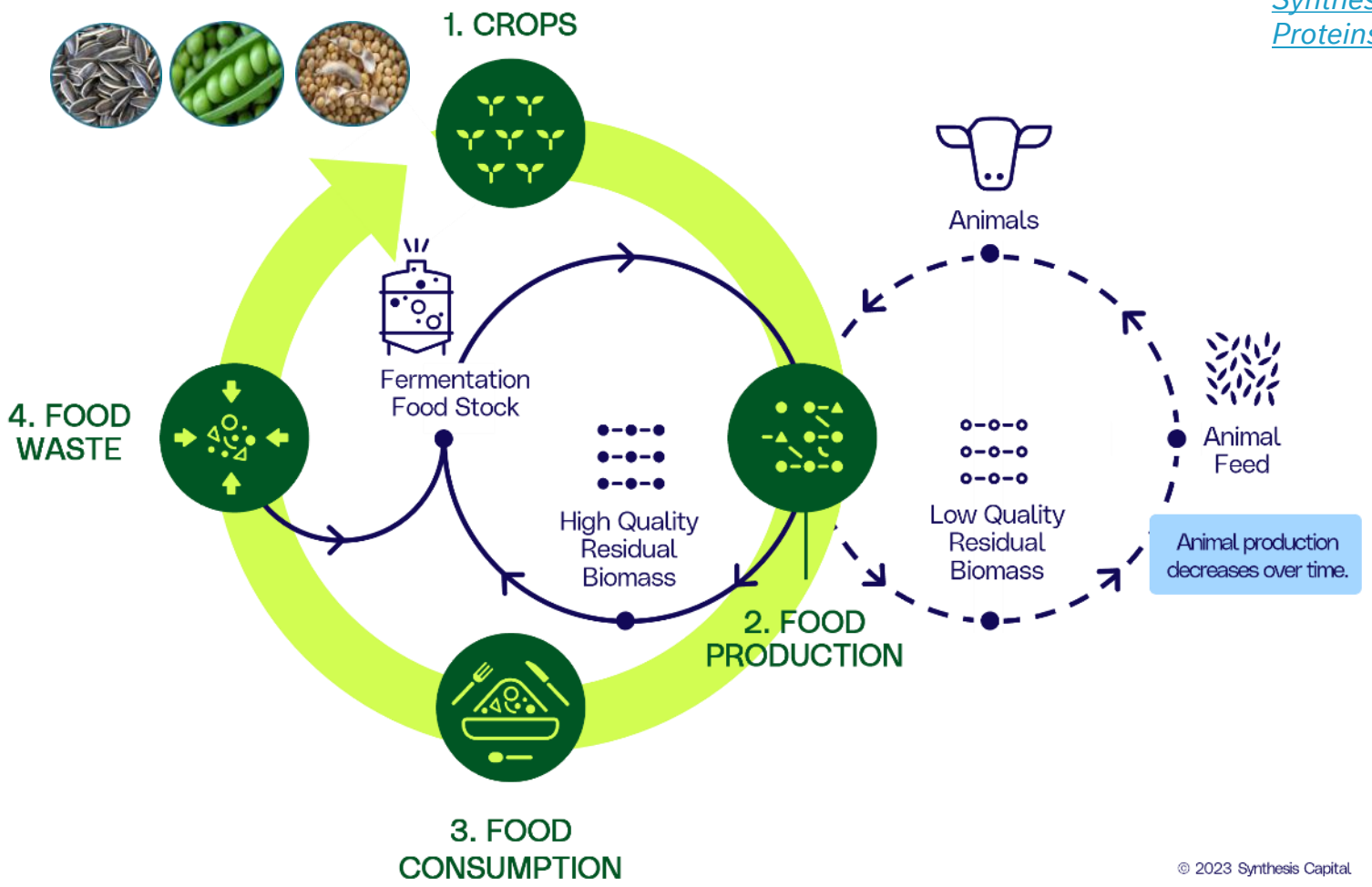
Research and Development

Multiple Nestlé expertises are combined to deliver plant-based innovations

Research and Development

Processing of plant-based raw materials is increasing their nutritional and functional quality

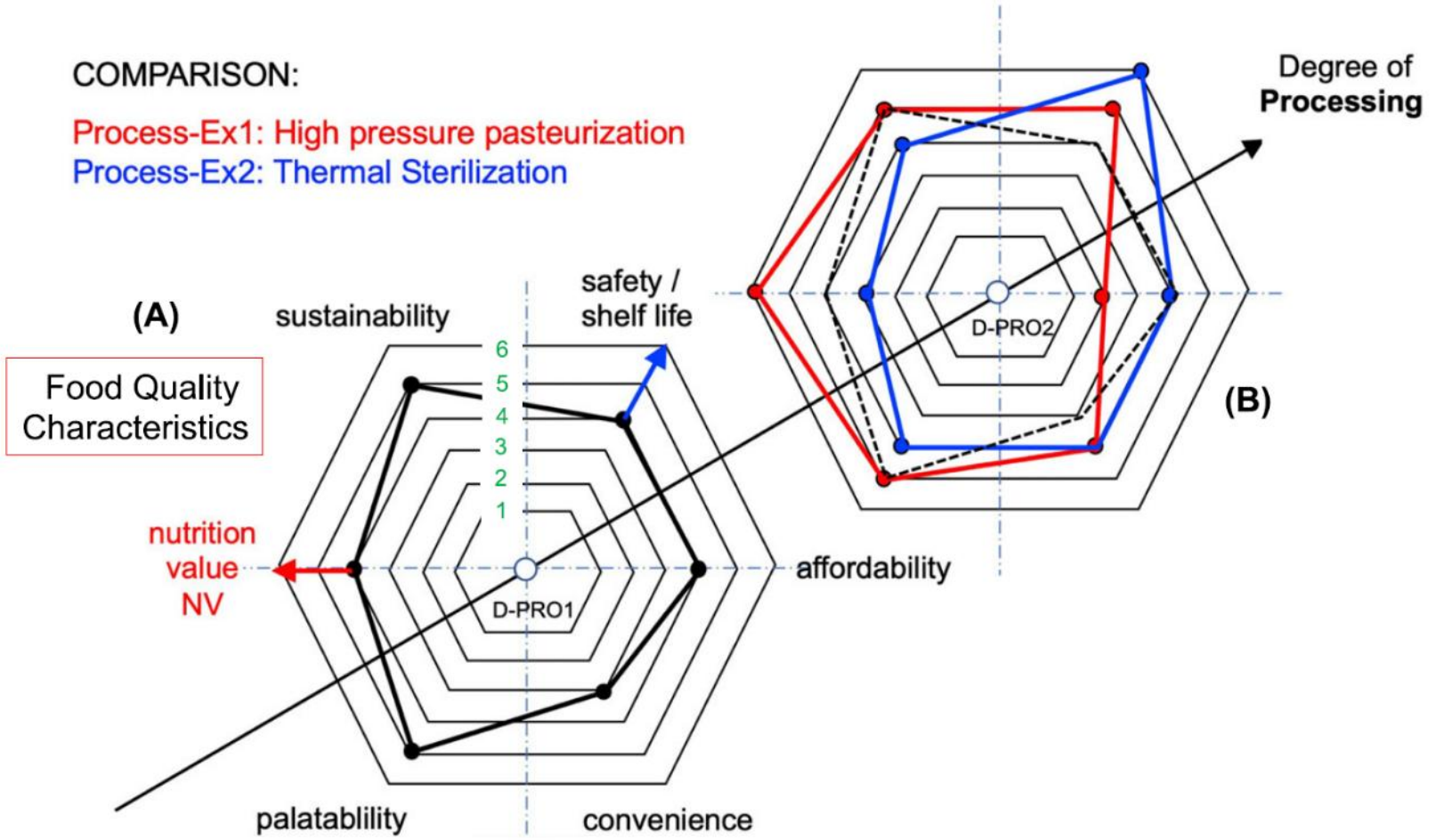
Synthesis Capital | From Linear to Circular: How Alternative Proteins...



- Plant raw materials: key building blocks in global food & feed systems
- Crop processing: creation of high value nutrient streams

Research and Development

Smart selection of processing delivers multiple benefits in food products

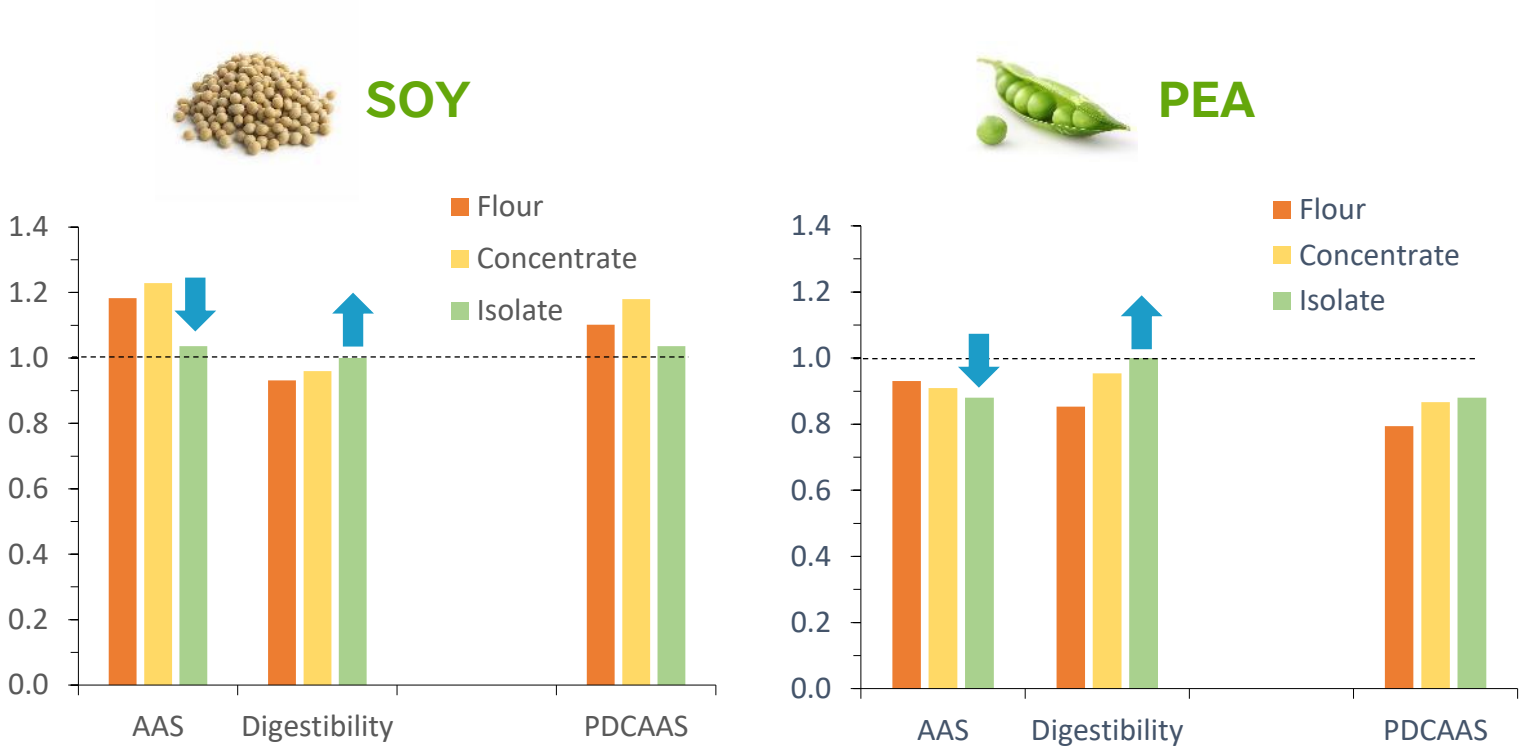


- Processing: flexible toolbox for triggering quality characteristics of food products
- Smart processing combination: optimizing product benefits for a given cost target & manufacturing capacity

Ahrné et al. (2024). npj Science of Food

Research and Development

Protein source & refinement level drive protein quality in plant-based materials



2013 FAO Reference pattern older children, adolescents & adults

- AAS (Amino Acid Score) reduced by refinement level: loss of some essential amino acids during extraction
- Digestibility* increased by refinement level: removal non-protein components and/or antinutritional factors

**Digestibility data determined in vitro by Megazyme kit*
PDCAAS: Protein Digestibility Corrected Amino Acid Score

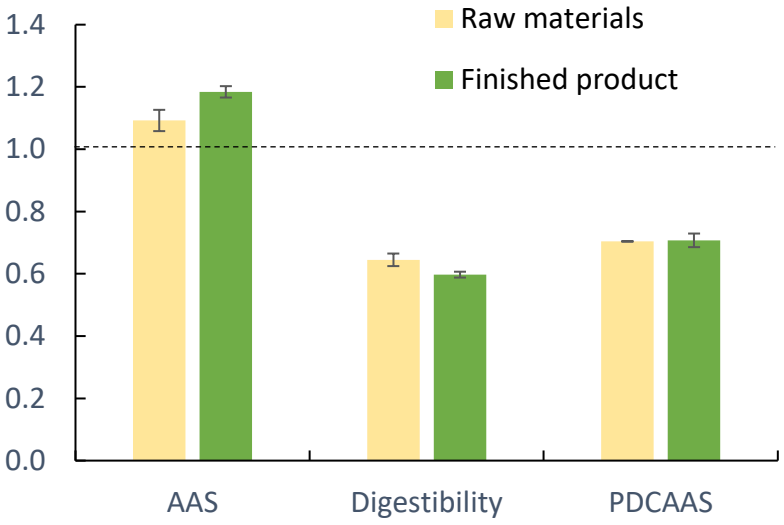
Petit et al. (2026). 9th Int Conference on Food Digestion

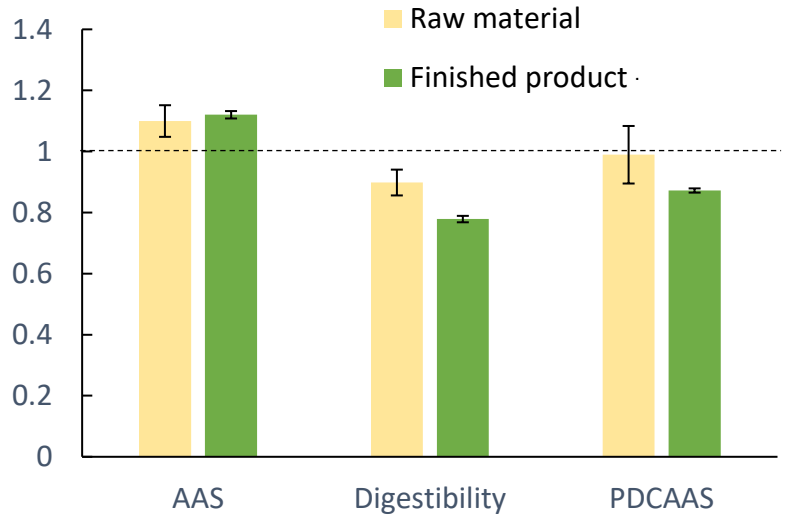
Research and Development

Protein quality is impacted by the formulation and/or the process in final products

Falafel
Chickpea-based

Sensational Burger
Soy-based





- Falafel: PDCAAS driven by digestibility* of whole chickpea
- Plant-based burger: PDCAAS driven by digestibility* of soy ingredient & formulation (*e.g.* aroma, fibers)

**Digestibility data determined in vitro by internal digestion model based on Infogest*

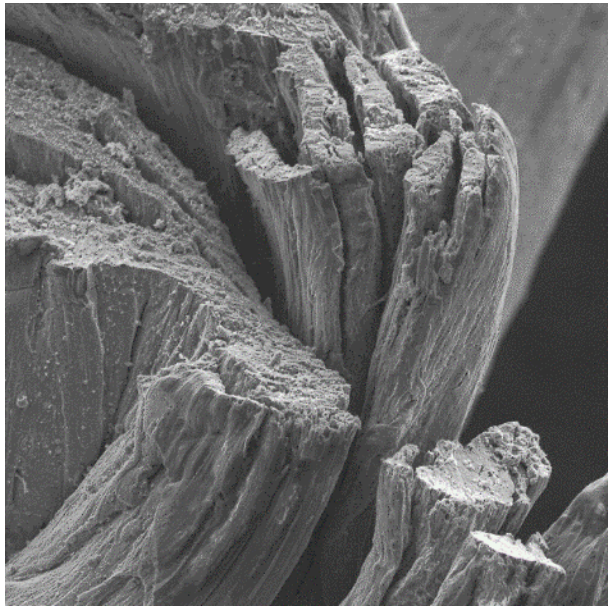
2013 FAO Reference pattern older children, adolescents & adults

Petit et al. (2026). 9th Int Conference on Food Digestion

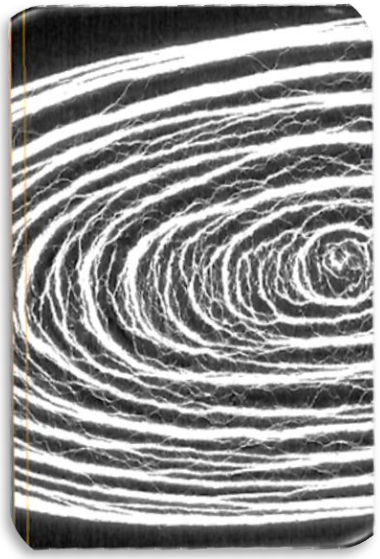
Research and Development

Texture design in plant-based fish alternative

- Wet extrusion expertise of plant proteins allows differentiating structure and texture with few ingredients



Wet extruded plant protein fibers



Cross-sectional structure of an extruded soy protein fibre by X-ray tomography

Taste & Aroma

Recognizable ingredients
pea, wheat

Nutrition
high in protein and fiber, omega-3 rapeseed oil

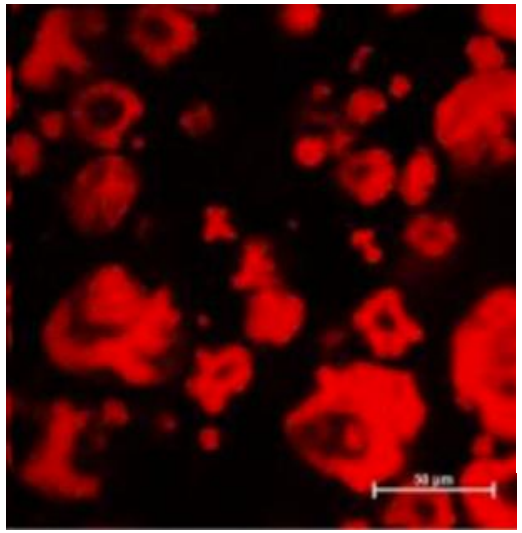
Sustainable

Schmitt et al. (2021). Cur Opin Colloid Interf Sci

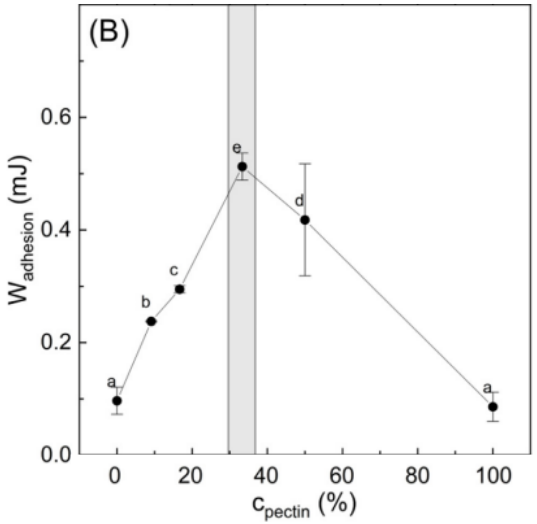
Research and Development

Texture design in veggie plant-based products

- Binding systems expertise using protein and polysaccharide blends enables developing nutritious and tasty veggie products



Pea protein/apple pectin complexes



Adhesion properties of pea protein/apple pectin complexes

Taste & Aroma

Recognizable ingredients
spinach, rice, wheat flour

Nutrition
high in protein and fiber

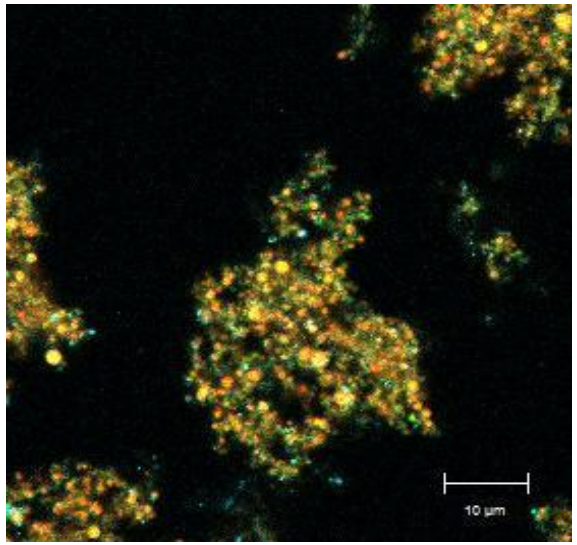
Sustainable

Moll et al. (2022). Food Hydrocolloids

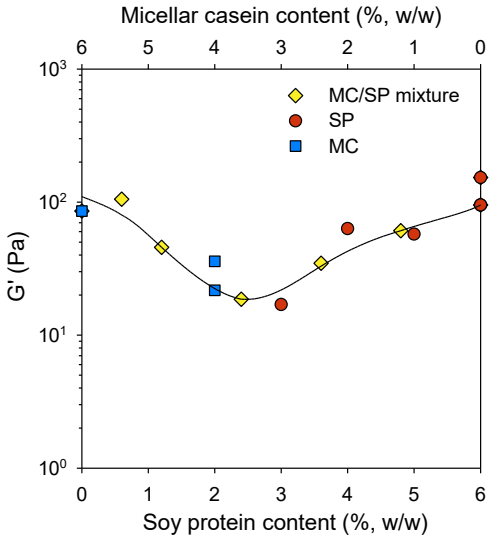
Research and Development

Taste and texture design in dairy/plant protein hybrids

- Protein blending expertise coupled with enzyme technology enables combination of dairy and plant proteins, resulting in nutritious and affordable beverages



Casein micelles/soy protein aggregates



Elastic modulus of casein micelles/soy protein mixtures

Taste & Aroma

Affordable

Nutrition
high in protein and fiber, fortified with vitamins and minerals

Sustainable

Schmitt et al. (2019). Cur Opin Food Sci

Research and Development

Take home messages

- For plant-based foods, it is important to consider protein quality and diversity, relevant micronutrient fortification and the sensory experience as consumer benefits,

- New technologies and innovations based on combinatorial expertise are key enablers to deliver on nutrient density and reduced environmental impact.

Research and Development

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