Value Opportunities for the Tillage Sector

Plant Processing and Valorisation

Prof. Mark Fenelon
Head of Food Programme

teagasc
Agriculture and Food Development Authority

SUSTAINABILITY

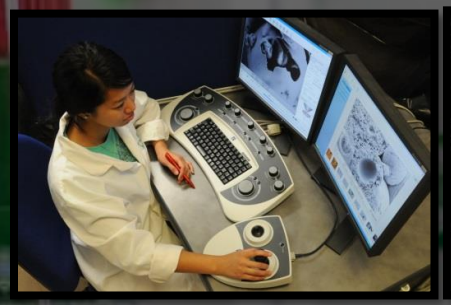
A Food Systems Approach

SUSTAINABILITY

Examples of new Research

1. Reducing food waste by developing product stream conversion- bioprocessing (circular economy)
2. Providing data to support labelling - based on dietary quality 'Nutri Carbon' per kg CO_2e (quality, digestion)
3. Alternative Ingredients made from plants / Crops (grains, legumes, and Marine)
4. Develop the technologies to support use of eco-friendly packaging- recyclable, compostable or biodegradable packaging
5. Ensuring the food safety, nutrition and quality of "climate-friendly" foods
    - Molecular based methodologies developed for microbiological quality indicators in food

Unlocking **P**rotein **R**esource **O**pportunity **T**o **E**volve **I**relands **N**utrition



An Roinn Talmhaíochta,
Bia agus Mara
Department of Agriculture,
Food and the Marine

U-Protein

www.U-Protein.com

U-PROTEIN

New Value Landscapes for Plant Protein Pathways

Co-ordinator Ewen Mullins

VALPRO.Path VALPRO_Path valpro-path

Co-funded by the European Union

Moving up the Value Chain – The D

Nutritional (Infant formula) / Medical Foods

Lifestyle Foods / beverages

Sports applications

Bioactive Fractions

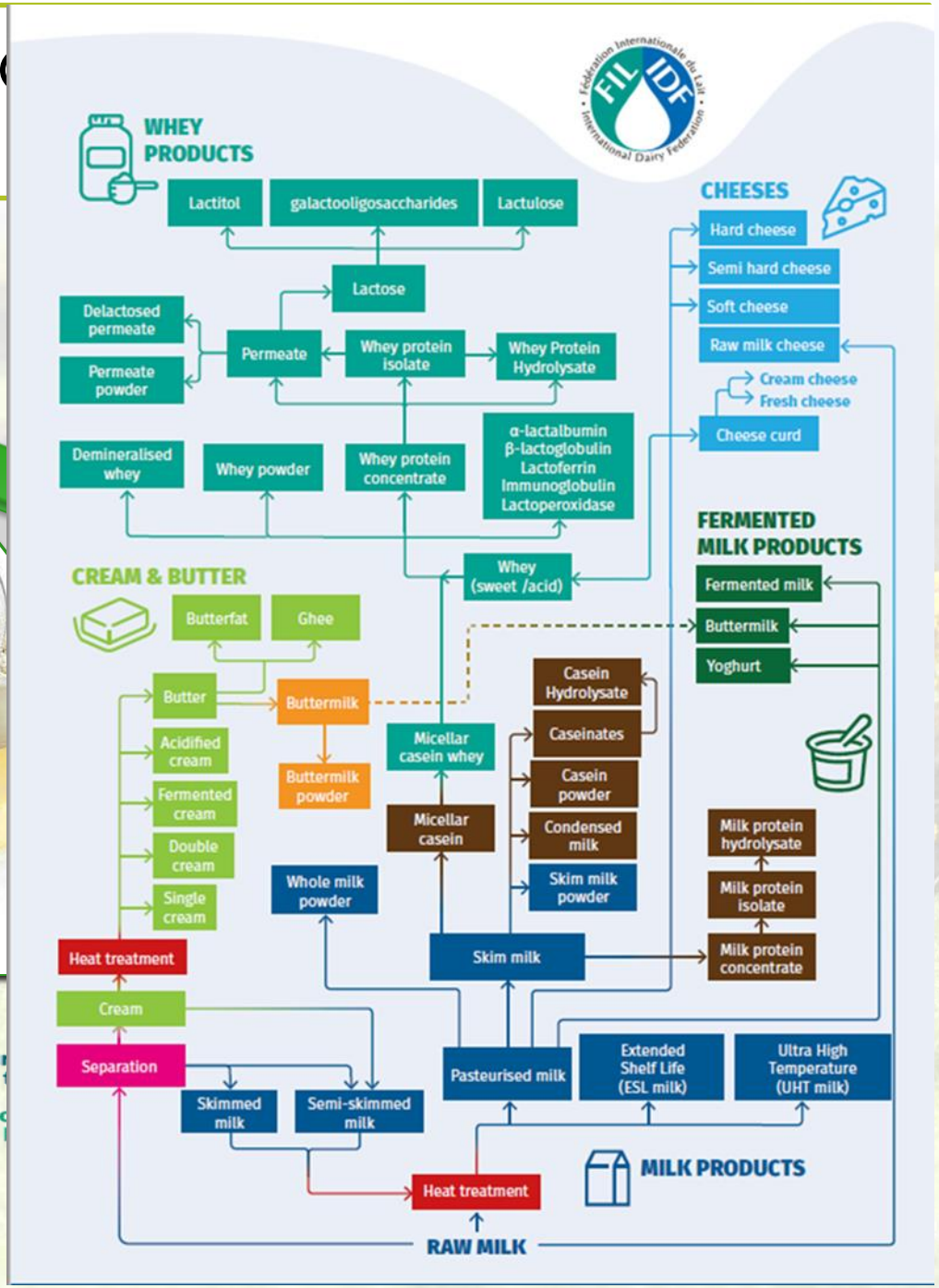
Milk / Whey Isolates

Milk/ Whey concentrates

Enriched Milk powders

Fortified Liquid Milk

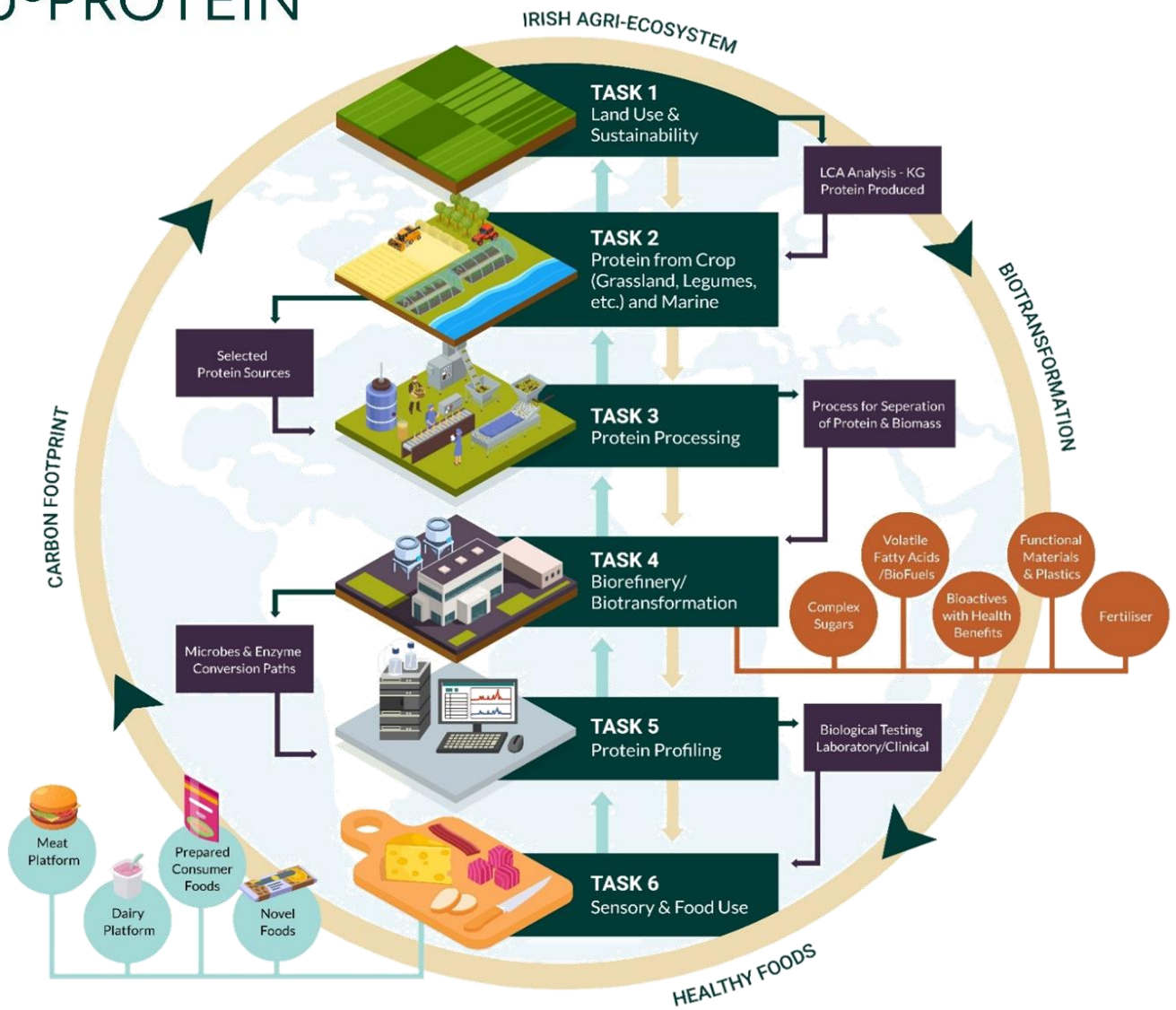
Liquid Milk / Milk powders



https://fil-idf.org/our-work/dairy-science-and-technology/the-milk-tree-technology-and-use/

Development of Plant Based Ingredients

U-PROTEIN



Expected Outputs

- Novel protein products
- Digestibility score
- Valorised Plant Biomass
- Land use models
- LCA /Kg Protein

Scaling up the Plant Biomass Processes and Protein Extraction Unit

Process Design

- ✓ Continuous or batch?
- ✓ Scaling factor determination
- ✓ Economic aspects assessment

Optimization

- ✓ Process optimization
- ✓ Barriers to improve scale up efficiency?
- ✓ Ingredient functionality

Procurement

Nutrition and Safety

- ✓ Nutrient Density
- ✓ HACCAP & QA measures
- ✓ Compliance with safety-environmental regulations

Publication (2023)
Kamani, M. H., Fitzsimons, S. M., Fenelon, M. A., & Murphy, E. G. (2023). Unlocking the nutritional and functional potential of legume waste to produce protein ingredients. Critical Reviews in Food Science and Nutrition, 1-19.

Publication (2024):
Kamani, M. H., Fitzsimons, S. M., Fenelon, M. A., & Murphy, E. G. Determining the influence of fava bean pre-processing on extractability and functional quality of protein isolates. Food Chemistry

ROTEIN

→ Transition


Faba Bean


Faba Bean
Protein Isolate

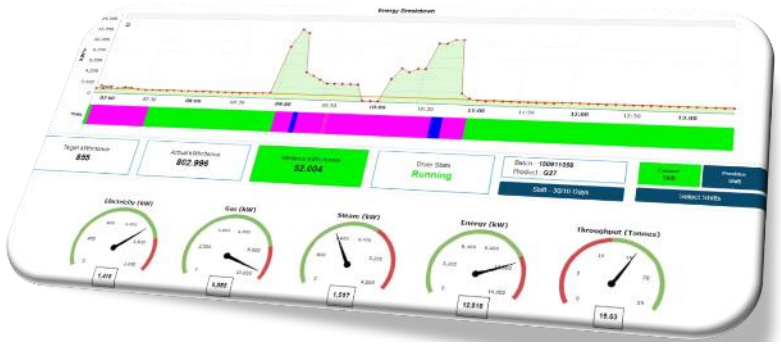

De-hulled Faba Bean


Faba Bean Hull

U-PROTEIN

VALPRO path.

- Nutritional Berverage produced using Fava, Lupin, Pea protein isolate. Functionality testing complete.
- Rapid testing methods establised for isolate and finshed product testing.
- New drying system tested for dyring of plant based residual biomas after protein extraction
- Evaluation of Intelligent digital platforms, including web based tools for processing.



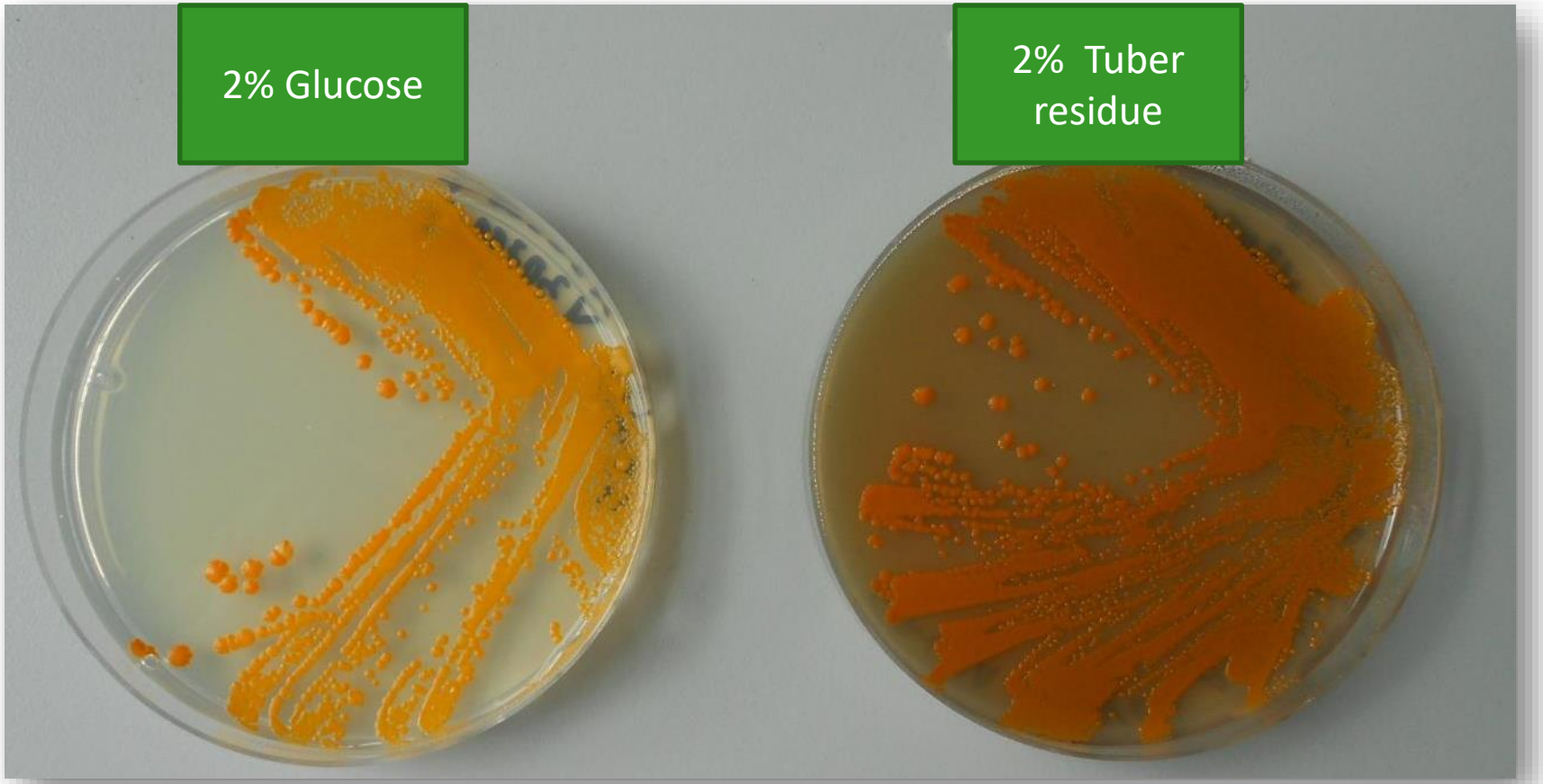
Can we valorise deproteinated plant matter by biotransformation?

Valorisation of Fructans from Tuber Residue

Olivia McAuliffe
Teagasc, Moorepark

Arun Rajkumar
Teagasc, Moorepark

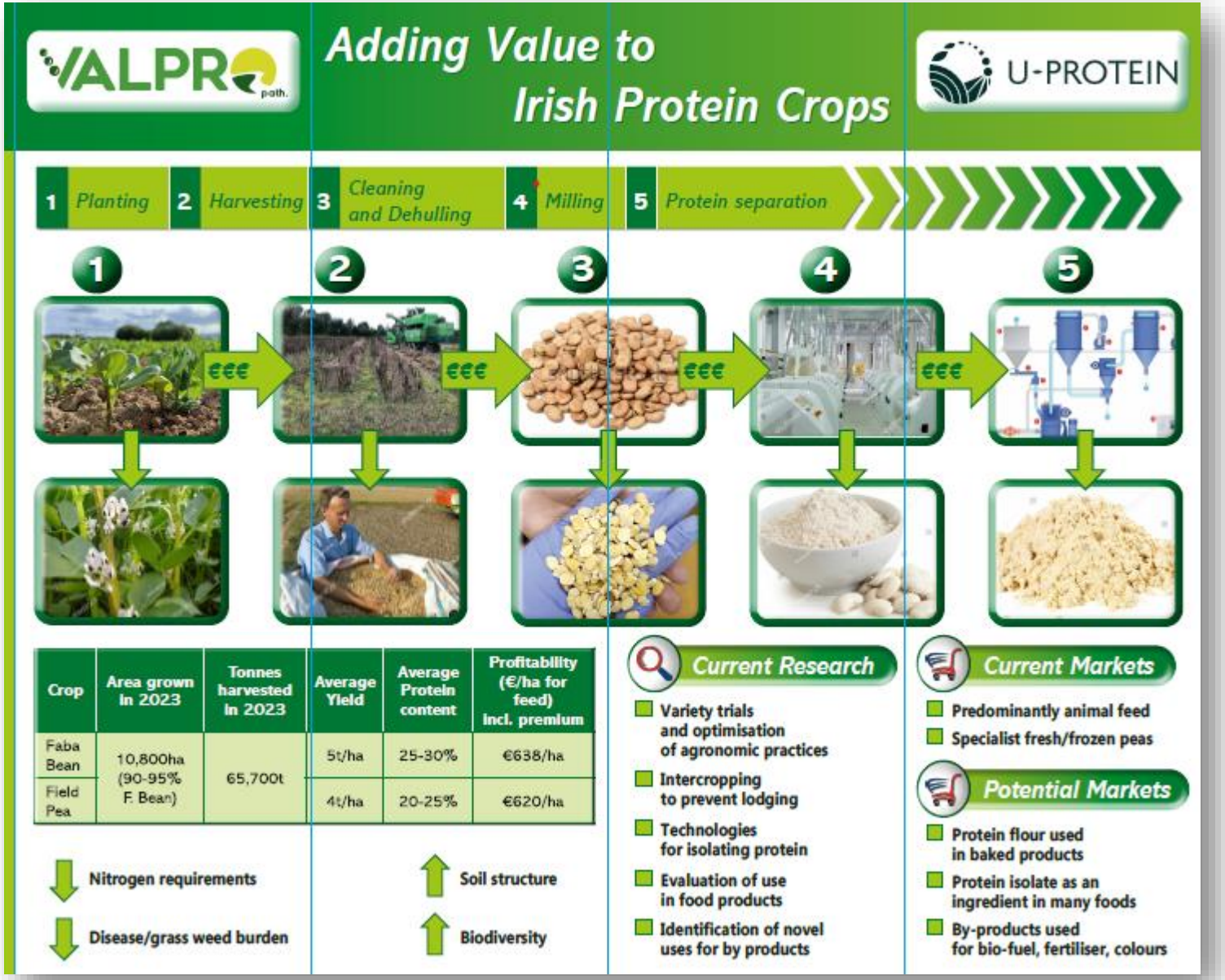
U-PROTEIN



*Yeast engineered to produce the food pigment β-carotene (**left**) can consume fructans from tuber residue (**right**) and produce carotene with no decrease in pigmentation*

An Roinn Talmhaíochta, Bia agus Mara
Department of Agriculture, Food and the Marine

teagasc
Agriculture and Food Development Authority



Thank you!

eagasc
Agriculture and Food Development Authority