Feed-a-Gene

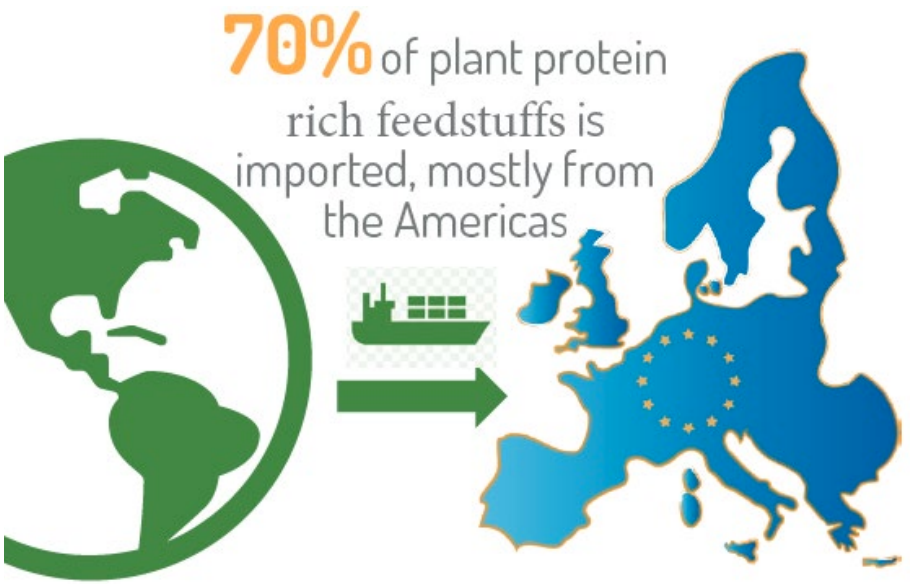
Adapting the feed, the animal and the feeding techniques to improve the efficiency and sustainability of monogastric livestock production systems

In the search for European protein autonomy – more and better

The Feed-a-Gene Project has received funding from the European Union's H2020 Programme under grant agreement no 633531.

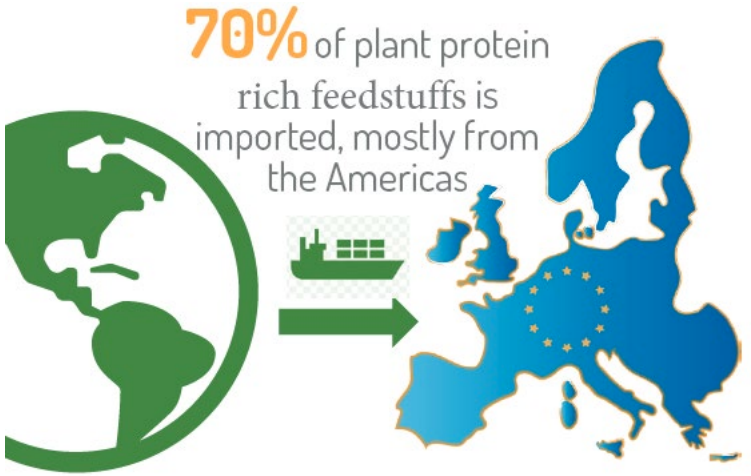
Background

- Europe has a chronic protein deficit; approximately 70% of protein rich feedstuffs is imported
- **Rapeseed**, sunflower and **soybean** are the three main protein crops in Europe with annual productions of 22.6, 9.1 and 2.5 mill tons
- The land used for **soybean** has quadrupled over the last 5 years and with a potential to increase even further
- **Green biomass** may have a potential to become a regional protein source in Europe

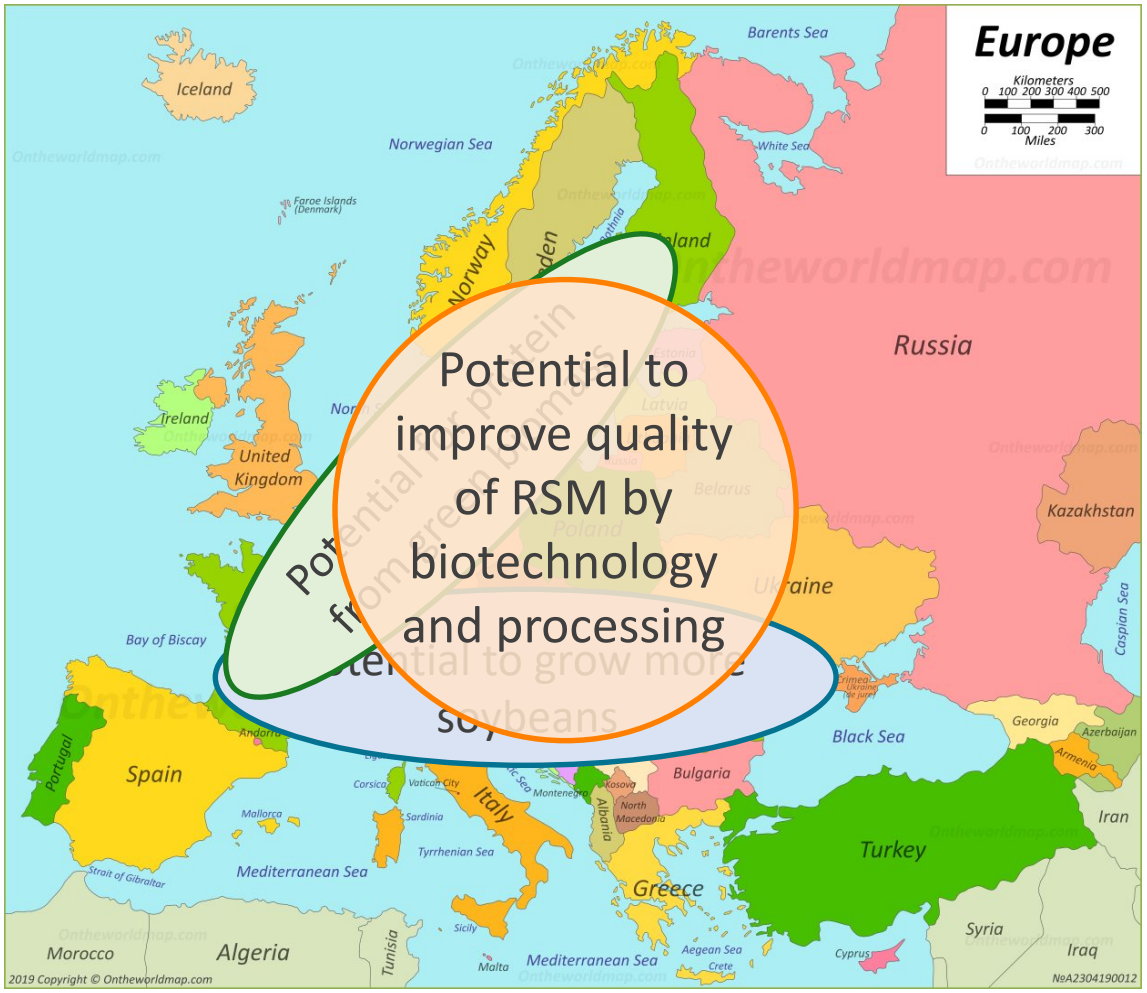


Strategic actions in the Feed-a-Gene project

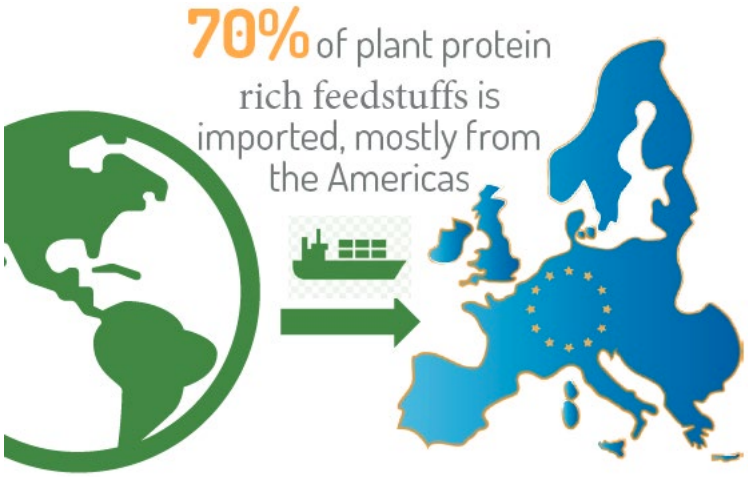
- European grown soy bean and new processes technologies to improve nutritive value of SBM
- Green biomass as a sustainable protein source
- Processing of RSM for improved quality
- Biotechnological means to improve quality of RSM
- New technologies for evaluating nutritional quality in real-time



More and better protein in Europe



European grown soy bean



European grown soy bean

New processing technologies to improve nutritive value of SBM

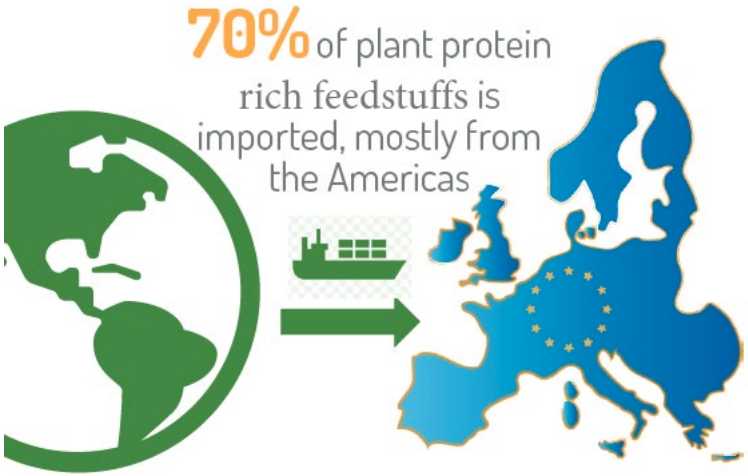
Processes used in Feed-a-Gene involve **extrusion or cooking with or without dehulling** to produce expeller SBM

- ➡ reduced content of antinutritional compounds
- ➡ high protein and amino acids digestibility

Terres Inovia
l'agronomie en mouvement

ifip
institut du porc

Protein from green biomass



Biomass from grasses and legumes

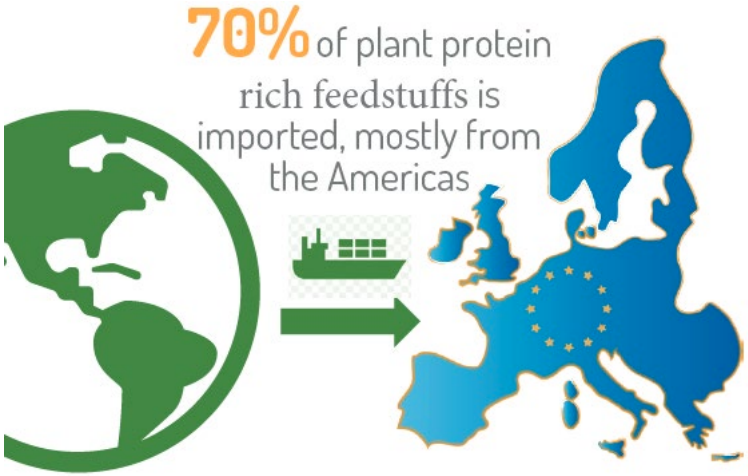
⇩

Separation of soluble protein from insoluble protein

Fractionation of green biomass into a protein **concentrate** rich in soluble protein and **pulp** rich in insoluble protein

- ⇒ higher protein and amino acids content
- ⇒ reduced content of antinutritional compounds

Improving the quality of rape seed meal



European rape seed meal

⇩

Tail-end separation of RSM and use of biotechnological means

Tail-end separation of RSM into fine and coarse fractionations

- ➡ higher protein and amino acids digestibility
- ➡ removal of fibre and antinutritional compounds

BÜHLER

Biotechnological means to improve nutritional value

- ➡ removal of antinutritional compounds
- ➡ improved feed efficiency

DUPONT

HAMLET PROTEIN

Nutritional evaluation of European grown soybean products processed with different technologies

- In vitro evaluation of soybean products
  - Study of in vitro rate and extent of protein digestion
- Study with weaned piglets
  - Performance
  - N-retention
  - Ileal digestibility of amino acids
  - Apparent and standardized ileal digestible amino acid content
- Study with broiler chicken
  - Performance
  - Slaughter quality
  - Digestibility & digesta viscosity

Nutritional evaluation of protein concentrate and pulp from green biomass

- In vitro evaluation of protein concentrate
  - Study of in vitro rate and extent of protein digestion
- In vivo evaluation of protein concentrate
  - Apparent and standardized ileal digestibility of protein and amino acids in pigs
- In vivo evaluation of pulp for rabbits
  - Performance
  - Total tract digestibility of nutrients

WAGENINGEN UNIVERSITY & RESEARCH

AARHUS UNIVERSITY

IRTA RESEARCH & TECHNOLOGY FOOD & AGRICULTURE

Nutritional evaluation of rape seed products

- In vitro evaluation of physically separated rape seed meal
  - Study of in vitro rate and extent of protein digestion
- In vivo evaluation of physically separated rape seed meal
  - Performance
  - Ileal and total tract digestibility of nutrients
- Study of RSM without and with enzymes in broiler chicken
  - Performance
  - Slaughter quality
  - Digestibility & digesta viscosity
- In vivo evaluation of bioprocessed RSM without and with enzyme addition
  - Performance
  - Ileal and total tract digestibility of nutrients

WAGENINGEN UNIVERSITY & RESEARCH

IRTA RESEARCH & TECHNOLOGY FOOD & AGRICULTURE

Newcastle University

IRTA RESEARCH & TECHNOLOGY FOOD & AGRICULTURE

Evaluation of nutritive value in real-time

Development of calibration equations from NIR scans based on in vivo database with feedstuffs and mixtures

AARHUS UNIVERSITY

Developments of equations for macronutrients, amino acids, total tract digestibility of energy and nutrients and metabolizable energy in pigs

eME by using table values for composition and digestibility of nutrients, **R^2 = 0.89**

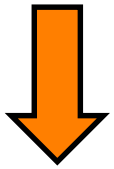
eME calculated from NIR estimated components and NIR digestibility estimates, **R^2 = 0.94**

eME directly from NIR calibration, , **R^2 = 0.94**

Protein concentrates from RSM

The use of RSM in animal nutrition is restricted by its content of antinutritional compounds and lower protein digestibility

Better use of rape seed concentrate with higher protein concentration and decreased content of antinutritional compounds



Innovative approaches to produce rape seed protein concentrates with lower costs

The researchers behind

- Aarhus University: Søren Krogh Jensen, Helle Nygaard Lærke, Samantha Noel, Knud Erik Bach Knudsen
- Ifip-institut du porc: Eric Royer
- Kaposvár University: Veronika Halas
- IRTA – Animal Nutrition: Rosil Lizardo, A.D.B. MELO
- Newcastle University: Ilias Kyriazakis, Panagiotis Sakkas
- Wageningen University & Research: Paul Bikker
- DuPont: Jens Frisbæk Sørensen
- Hamlet Protein: Jonathan Dickow
- Bühler: Thomas Oberholzer
- Terres Inovia: Alain Quinsac
- Olead: Patrick Carré

….and the organisations

ifip institut du porc
Newcastle University
AARHUS UNIVERSITY
OLEAD Oils, oilseeds & pulses processing
WAGENINGEN UNIVERSITY & RESEARCH
Terres Inovia l'agronomie en mouvement
KAPOSVÁR UNIVERSITY
IRTA RESEARCH & TECHNOLOGY FOOD & AGRICULTURE
BÜHLER
DUPONT
HAMLET PROTEIN

Thank you very much for your attention!