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

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.

70% of plant protein rich feedstuffs is imported, mostly from the Americas.
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
Adapting the feed, the animal and the feeding techniques to improve the efficiency and sustainability of monogastric livestock production systems.

More and better protein in Europe

Potential to grow more soybeans
Potential to improve quality of RSM by biotechnology and processing
Adapting the feed, the animal and the feeding techniques to improve the efficiency and sustainability of monogastric livestock production systems

European grown soy bean

70% of plant protein rich feedstuffs is imported, mostly from the Americas

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

New processing technologies to improve nutritive value of SBM
Protein from green biomass

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
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Improving the quality of rape seed meal

Tail-end separation of RSM into fine and coarse fractionations
- higher protein and amino acids digestibility
- removal of fibre and antinutritional compounds

Biotechnological means to improve nutritional value
- removal of antinutritional compounds
- improved feed efficiency
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
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
Evaluation of nutritive value in real-time

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

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

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….and the organisations

Thank you very much for your attention!