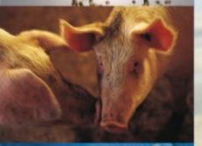
FEFAC



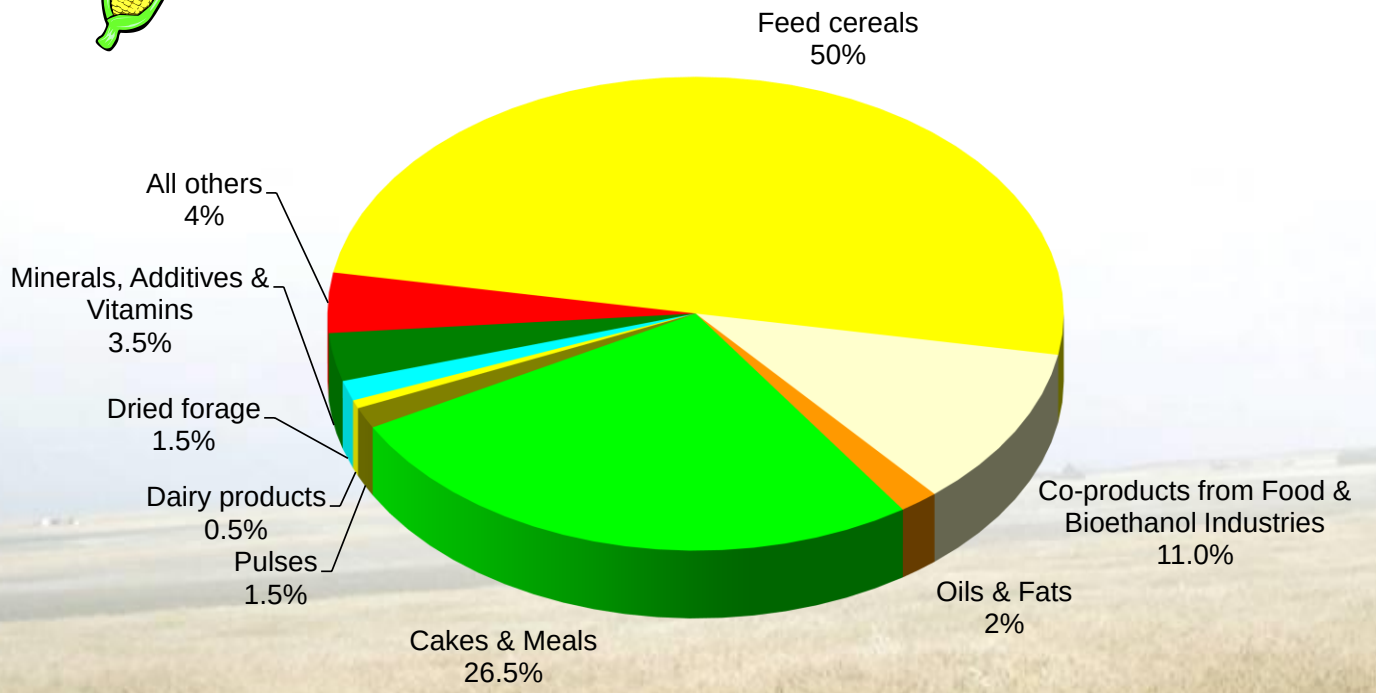
Feeding proteins to animals viewpoint of an animal nutritionist

Marek Kumprecht

25 April 2018

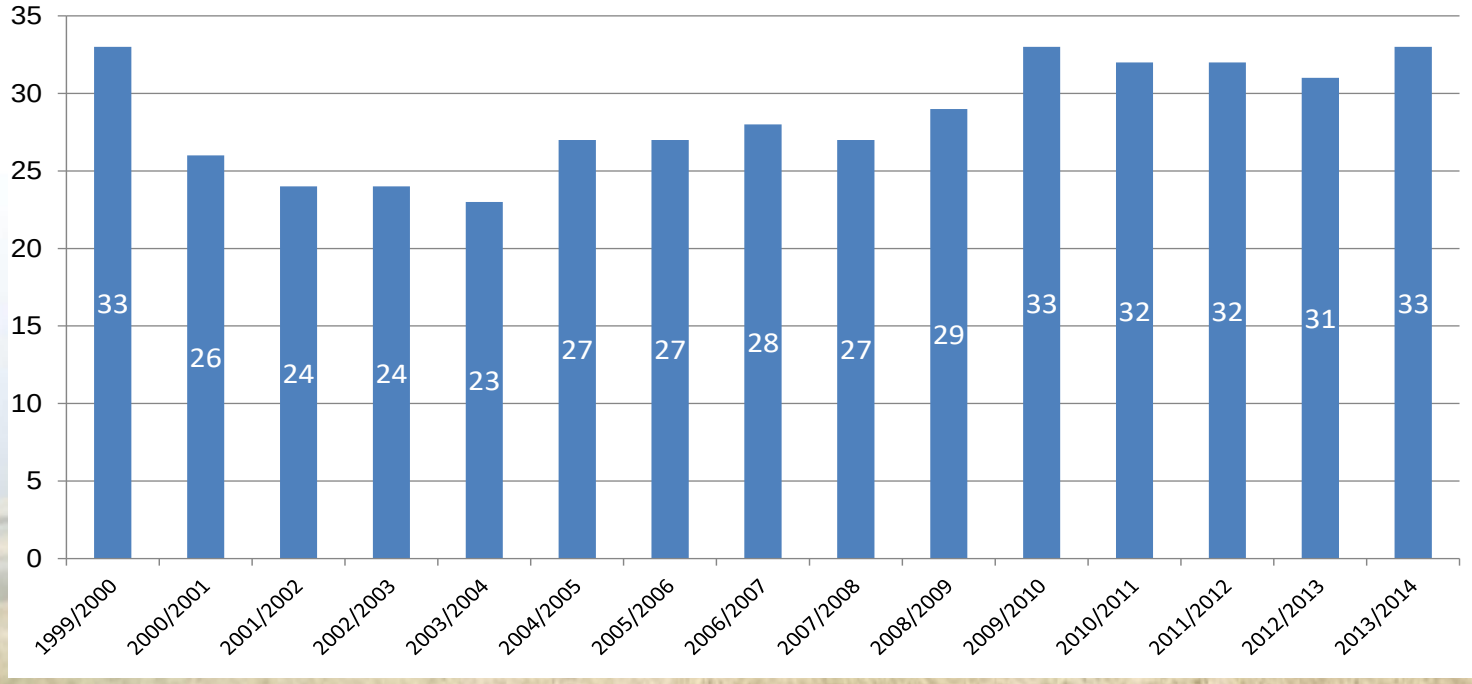
Feed material consumption by the EU-28 feed industry in 2016

Source: FEFAC



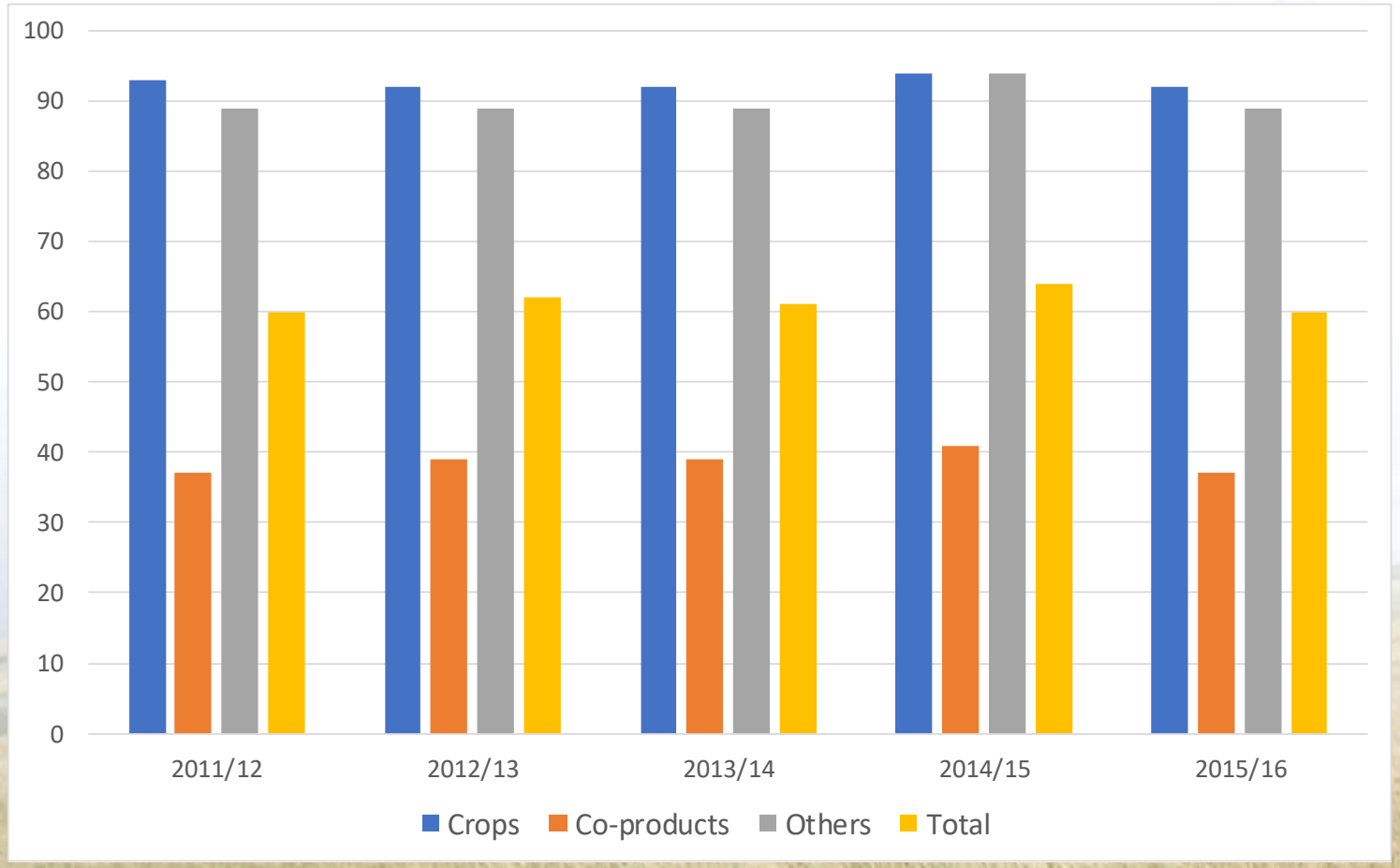
Evolution of EU protein supply self sufficiency (%)
« The old way »

Source FEFAC



Evolution of EU protein supply self sufficiency (%)
« The new way »

Source DG AGRI



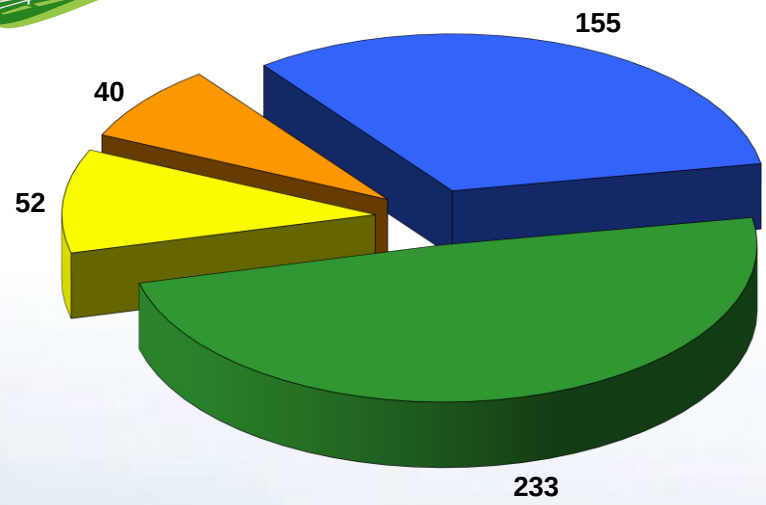
EU-28 protein balance sheet in 2016/17

	EU total feed use (mio. t proteins)	EU feed use of EU origin (mio. t proteins)	Self-sufficiency (%)
CROPS	**18.30**	**16.60**	**91**
Thereof wheat	5.76	5.40	**94**
barley	4.12	4.12	**100**
maize	4.22	3.24	**77**
oilseeds	0.50	0.50	**100**
pulses	0.77	0.71	**92**
CO-PRODUCTS (***)	**25.57**	**9.77**	**38**
Thereof soyabean meal(*)	13.37	0.67	**5**
rapeseed meal	4.36	3.43	**79**
sunflower meal	2.43	1.02	**42**
OTHER (****)	**0.92**	**0.86**	**93**
Thereof fishmeal	0.36	0.31	**86**
skimmed milk powder	0.06	0.06	**100**
TOTAL	**44.79**	**27.21**	**61**

EU-28 Livestock sourcing in feedingstuffs

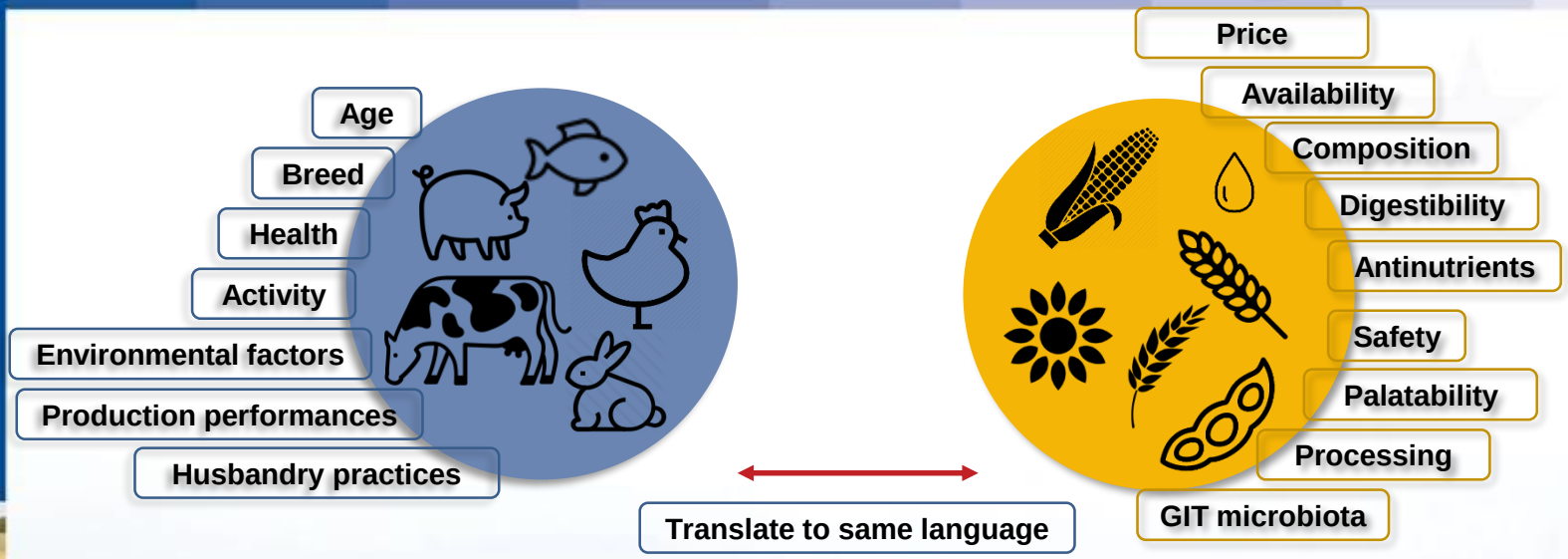
Every protein counts

Source: FEFAC / EU Commission

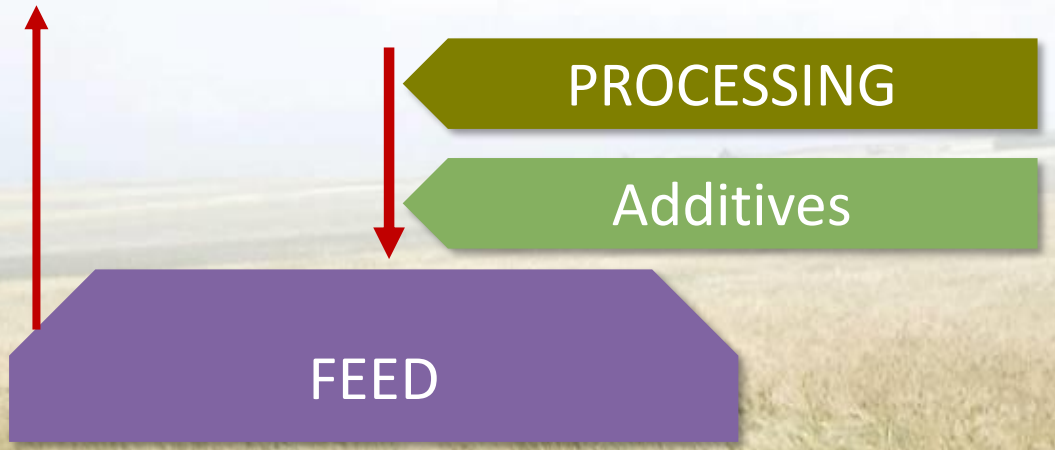


When looking at feed proteins, need to look at all sources (incl. forages)

Animal feed industry – the link between ingredients and nutrition



All these parameters matter when considering a feed protein supply!



Animal requirements Example of poultry feed

Nutrients	Units	Starter 0-10 days	Grower 11-24 days	Finisher >25 days
Protein	%	22-25	21-23	19-21
Metabolisable energy	Mj/Kg	12.60	13.30	13.50
	Kcal/kg	3010	3175	3225
Total Arginine	%	1.48	1.31	1.11
Digestible Arginine	%	1.33	1.18	1.00
Total Lysine	%	1.44	1.25	1.05
Digestible Lysine	%	1.27	1.10	0.92
Total Methionine	%	0.51	0.45	0.39
Digestible Methionine	%	0.47	0.42	0.36
Total Methionine +Cystine	%	1.09	0.97	0.83
Digestible Methionine +Cystine	%	0.94	0.84	0.72
Total Threonine	%	0.93	0.82	0.71
Digestible Threonine	%	0.80	0.70	0.61
Total Trypophan	%	0.25	0.22	0.19
Digestible Tryptophan	%	0.22	0.19	0.17
Total Valine	%	1.09	0.96	0.81
Digestible Valine	%	0.94	0.83	0.70
Calcium	%	1.0	0.90	0.85
Av.phosphorous	%	0.50	0.45	0.42

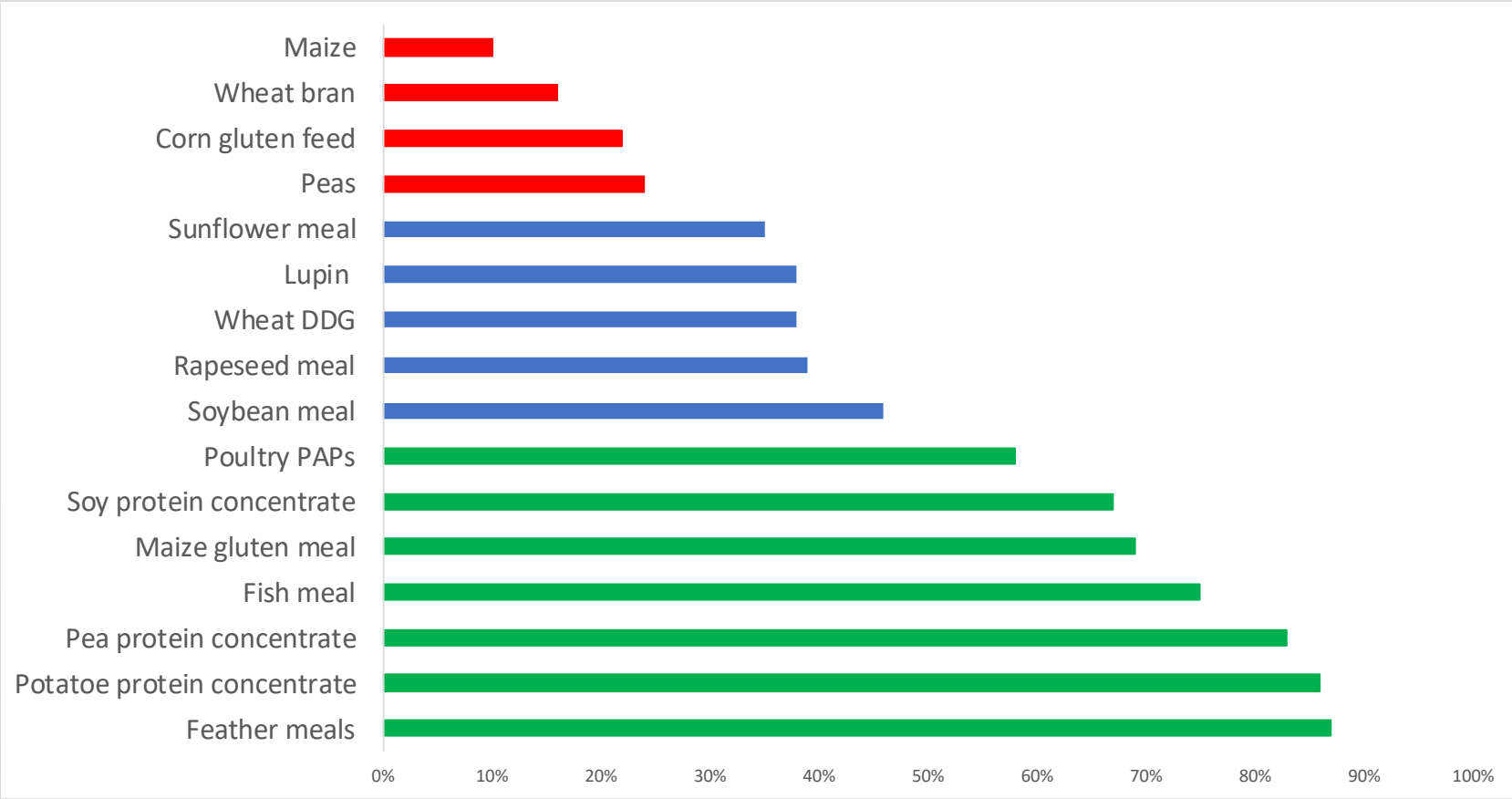
Soy a key protein source for livestock sector but not the only one

	Crude Protein (g/kg)	Ileal Digestable Lysine (g/kg)	€/kg Ileal Digestable Lysine
Potato protein	803	58,46	23,77
Soybean meal 50%	470	25,50	14,71
Rapeseed meal	340	11,83	21,56
Sunflower meal 35%	280	8,06	26,05
Maize gluten meal	600	8,67	95,16
Lupine	310	15,29	22,89

Different options for different species

Species	Young animals / fish	Ruminants	Monogastrics adults
Level of proteins of protein rich feed ingredients	Very high concentrations >60%	Moderate concentrations 27 - 44	High concentrations 30-48
Protein quality	Very high digestibility	Ruminant specific digestibility	Monogastric specific digestibility
Antinutrients	Very low levels	Low levels	Low levels

Levels of crude proteins in different high protein feed materials (%DM)



Offsetting the « imperfections » of individual protein sources

- Formulation of feed – several protein sources combined
- Balancing diet with free amino acids
- Optimisation of protein efficiency via
  - Rumen protection
  - Protein concentration
  - Elimination of antinutrients
  - Controling negative impact of upstream processing on digestibility (e.g. effect of Maillard reaction during drying on digestibility)

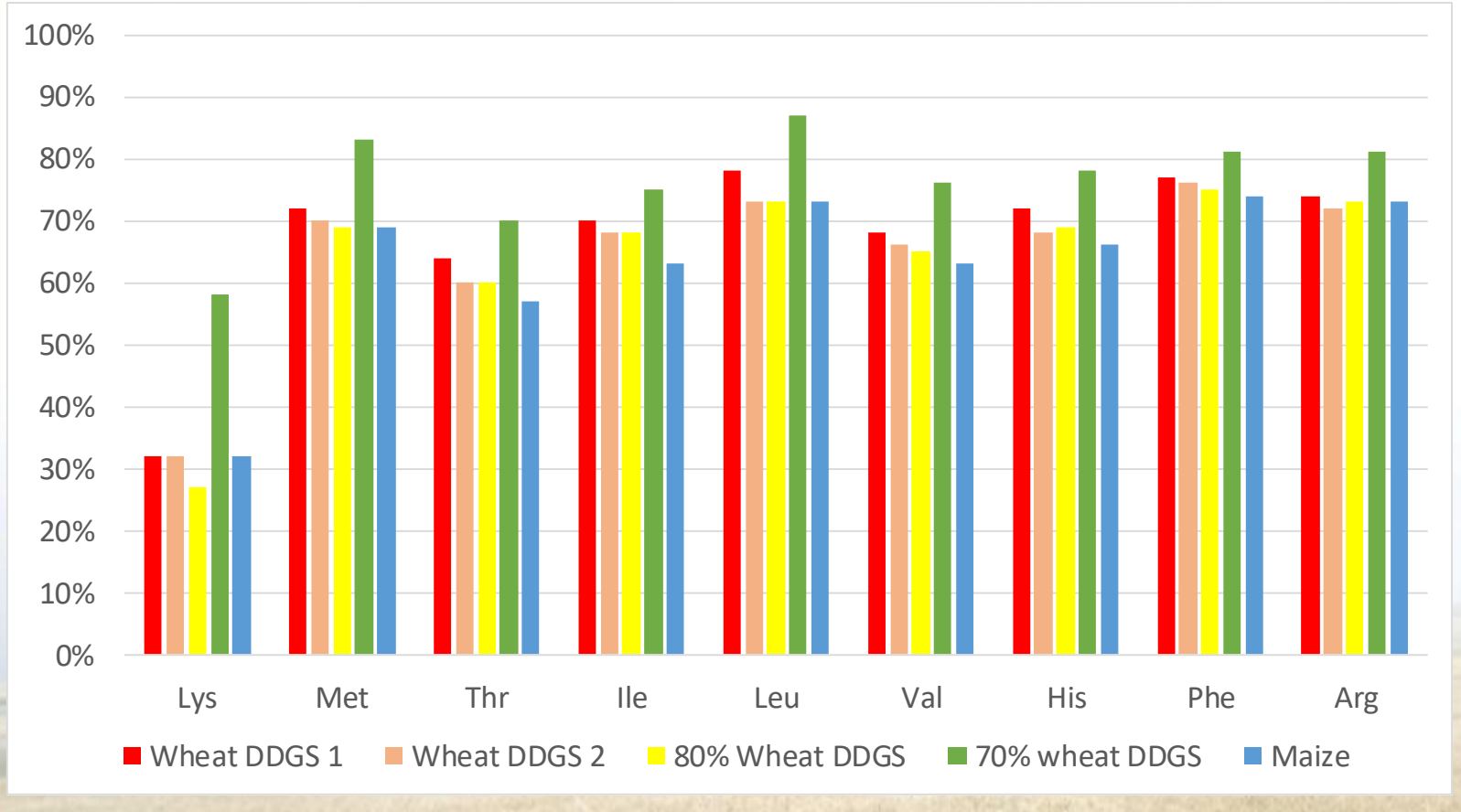
Effects of processing on levels of antinutritional factors

Antinutrient	Fullfat soya	High Pro SBM	Fermented soybean meal	SPC
Trypsin inhibitor mg/g protein	10-25	4-8	3-8	2-3
B-conglycinin mg/g	50-100	10-50	1-10	<0.002
Stachyose (%)	4 – 4,5	4.5 – 5	1-5	1-3
Raffinose (%)	0.8 - 1	1-1.2	0.2-1.2	<0.2
Phytic acid (%)	0.6	0.6	1.6	0.6

SPC: Soy protein concentrate

Source Hamlet

Digestibility of amino acids – results of trials with pigs for 5 different DDGS from EU origin (Illinois University 2014)



Can differences be explained by drying process?

Evolutions in formulation regarding protein use

- Levels of crude proteins
- Extension of range of amino acids
  - In 1985: Lysine, methionine
  - In 2018: Same + threonine, tryptophan, valine
  - In future: Isoleucine, …?
- Phase feeding
- Salmon feed without fishmeal

To conclude

- Every protein counts – complete the balance sheet
- Key evaluation criteria for protein sources are concentration, digestibility, balance in amino acids →primary selection criteria for plant breeding
- No « one-size-fits-all » solution: feed materials more or less fit for use depending on animal species
- Processing to optimise protein efficiency (concentration, rumen protection, elimination of antinutrients)
- Balancing of diets (amino-acids, phase feeding)
- Reduction of protein levels in feed – still potential for improvements but requires research in animal nutrition

Beware of trade-off

- Look not only at proteins
  - Antinutrients reducing protein efficiency
  - Environment emissions (e.g. rapeseed meal, rich in non-digestible phosphate)
- Societal demands
  - Impact of slow growing animals on feed protein requirements?
  - Role of plant breeding techniques in delivering more competitive protein crops
- Location of production of EU proteins vs. Land use change

THE FEFAC 2030 Animal Feed Industry Vision

Feed Safety Management	Animal Nutrition	Sustainability

FEED INDUSTRY ANIMAL FOOD CHAIN SOLUTIONS

Feed safety management capacity building

Preservation of animal health to reduce need for antibiotics

Accommodate animal welfare demands

Facilitate responsible sourcing

Increasing nutrient efficiency

Risk management optimisation along the feed chain

Develop new resource efficiency indicators

Improve the quality & nutritional value of food products

Co-operation between control authorities & industry operators

Measure the environmental performance of feed production

Thank you for your attention

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