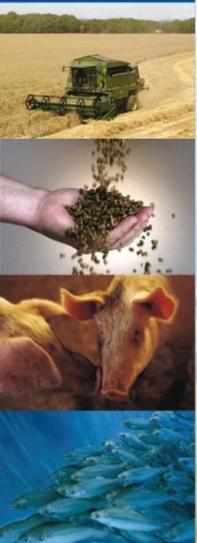


Feeding proteins to animals viewpoint of an animal nutritionist

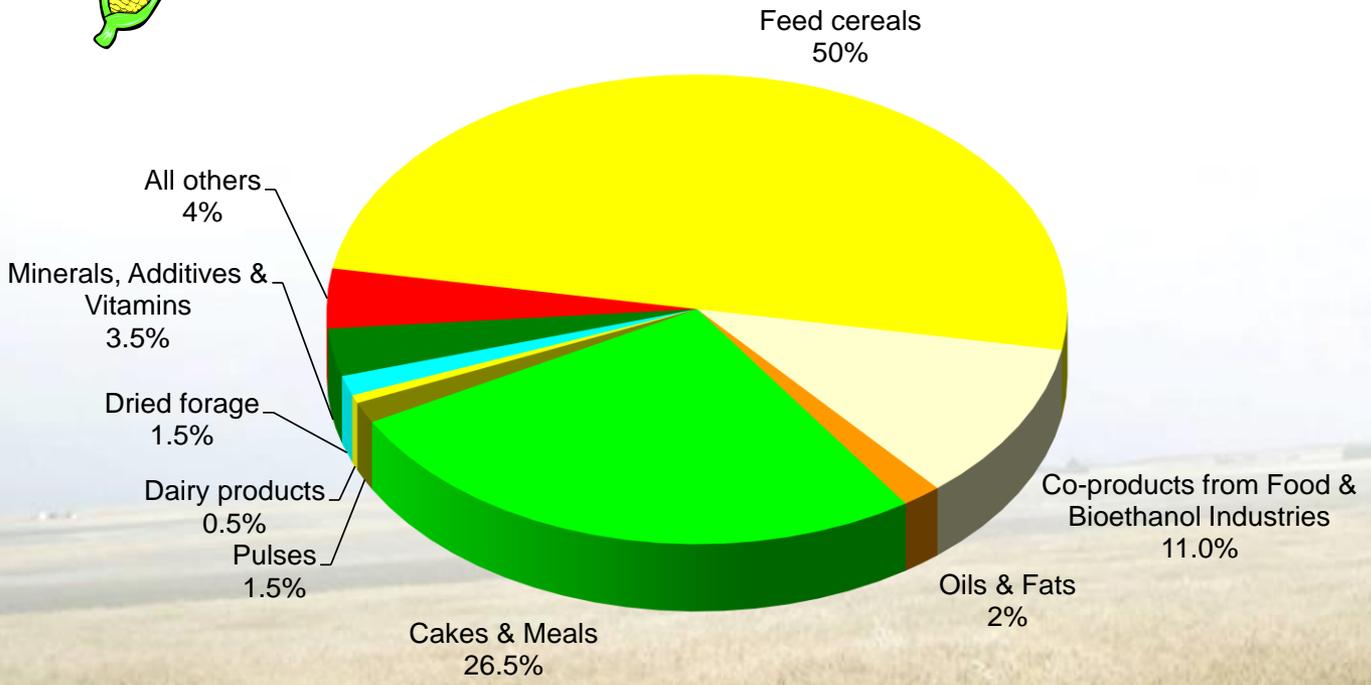
Marek Kumprecht
25 April 2018



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



Source: FEFAC

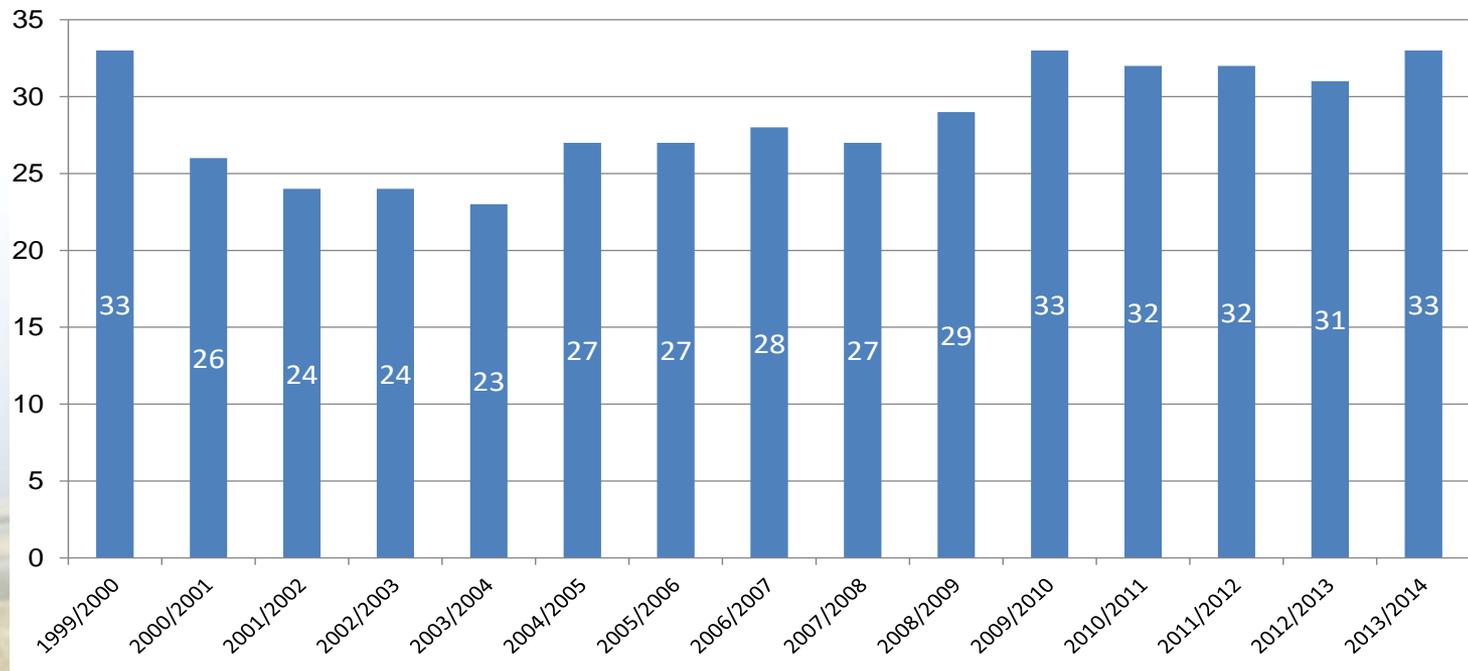




Evolution of EU protein supply self sufficiency (%)

« The old way »

Source FEFAC

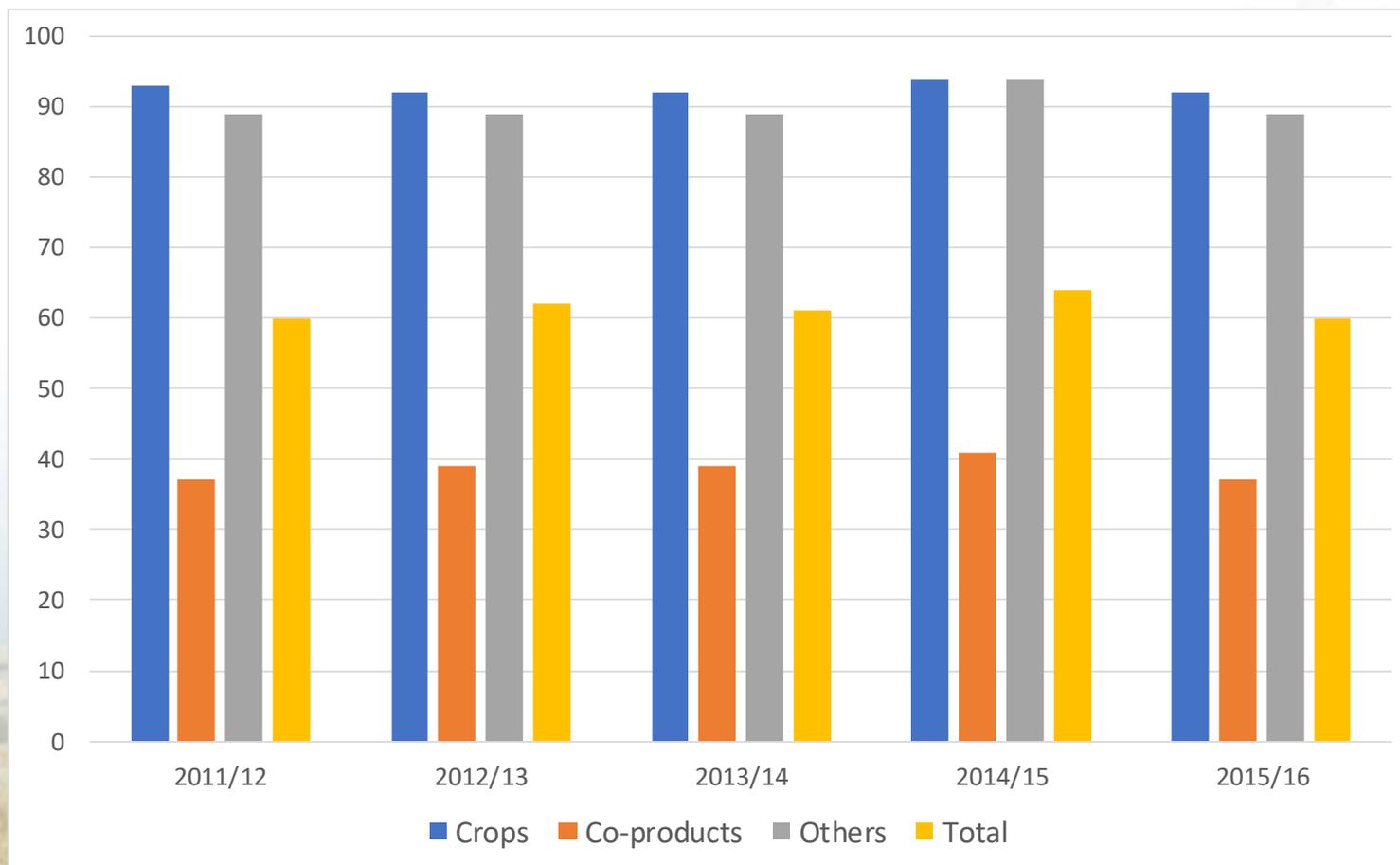




Evolution of EU protein supply self sufficiency (%)

« The new way »

Source DG AGRI



EU-28 protein balance sheet in 2016/17

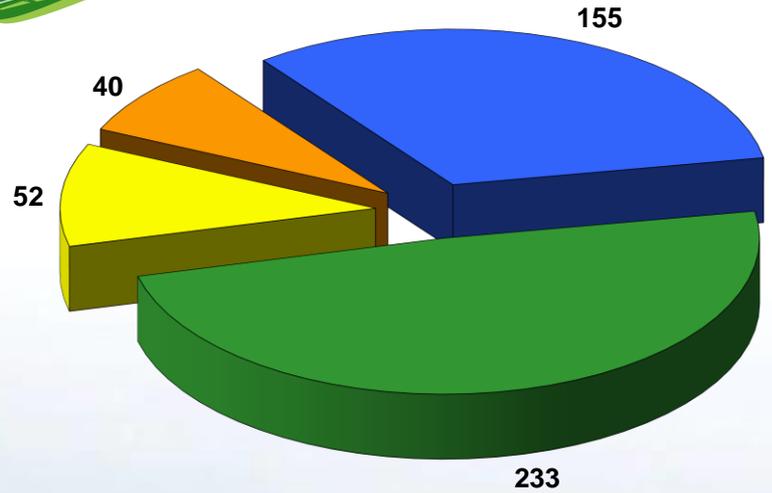
	EU total feed use (mio. t proteins)	EU feed use of EU origin (mio. t proteins)	Self-sufficiency (%)
CROPS	18.30	16.60	91
Thereof wheat	5.76	5.40	94
barley	4.12	4.12	100
maize	4.22	3.24	77
oilseeds	0.50	0.50	100
pulses	0.77	0.71	92
CO-PRODUCTS (***)	25.57	9.77	38
Thereof soyabean meal(*)	13.37	0.67	5
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



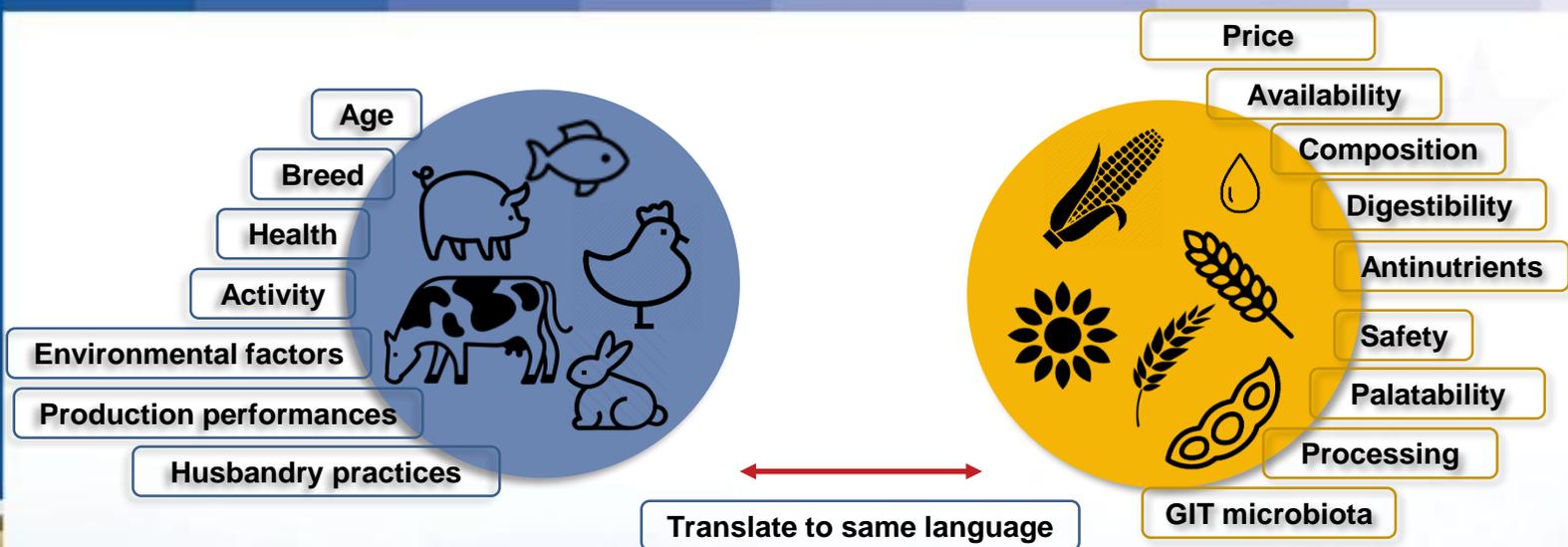
Source: FEFAC / EU Commission



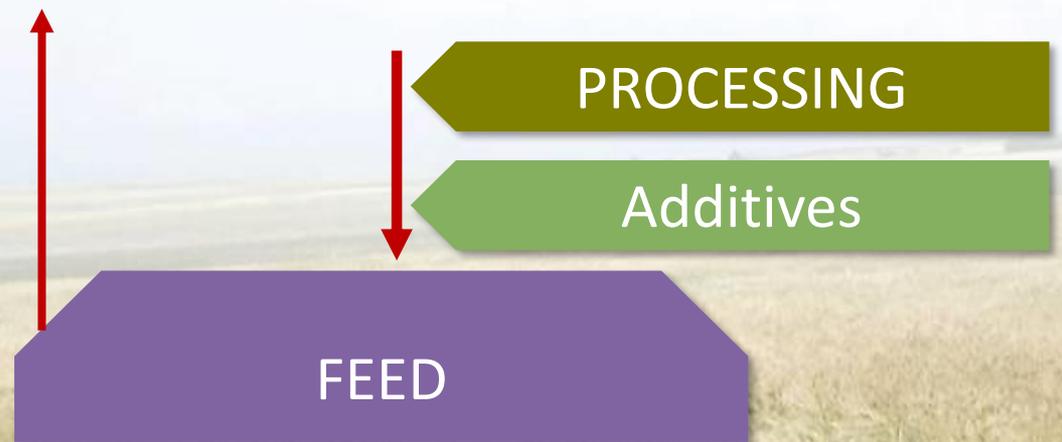
- Forages
- Home-grown cereals
- Purchased straight feedingstuffs
- Industrial compound feed

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	Grower	Finisher
		0-10 days	11-24 days	>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 Digestible Lysine (g/kg)	€/kg Ileal Digestible 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

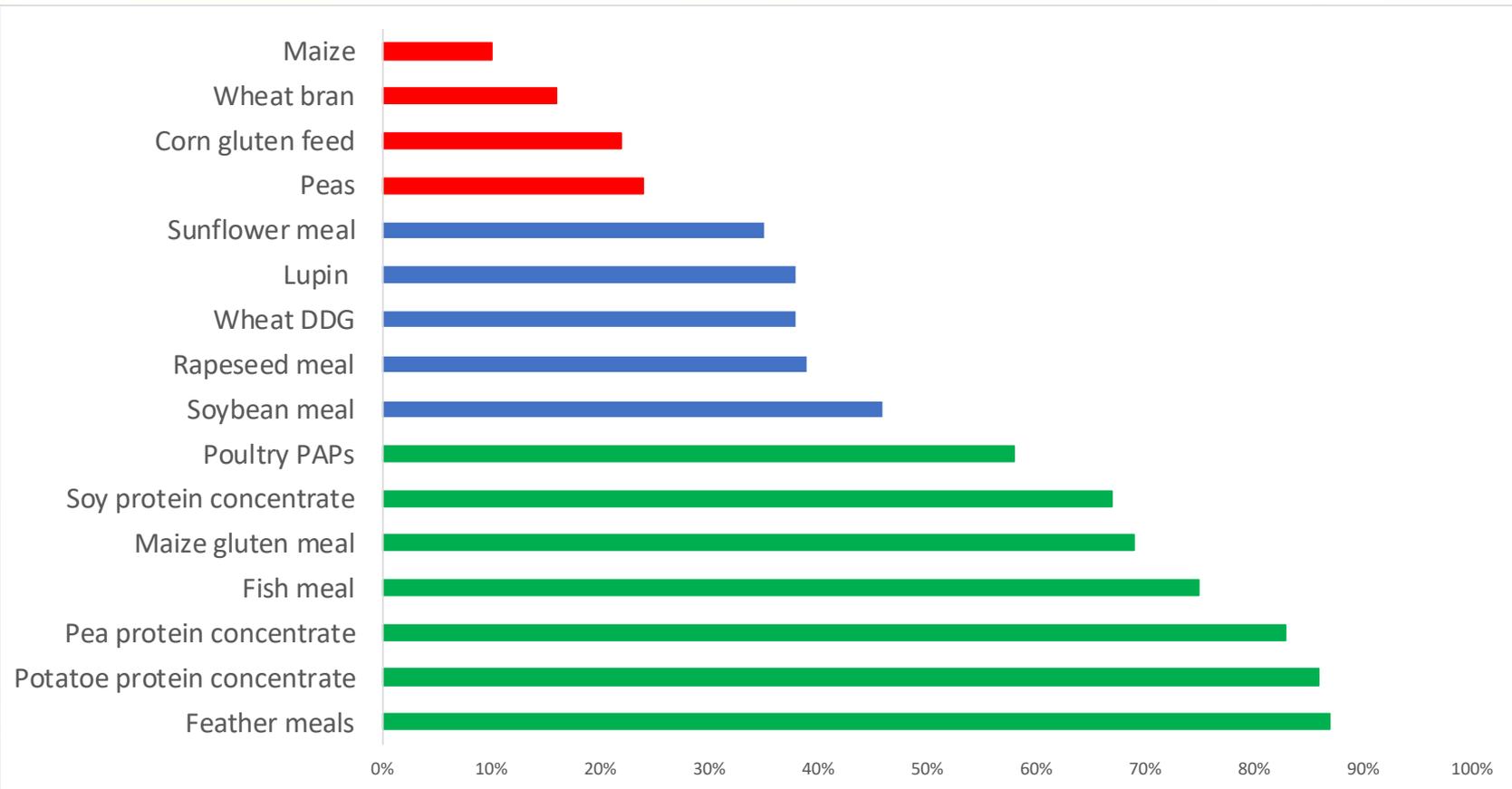


Different options for different species

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
 - Controlling 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

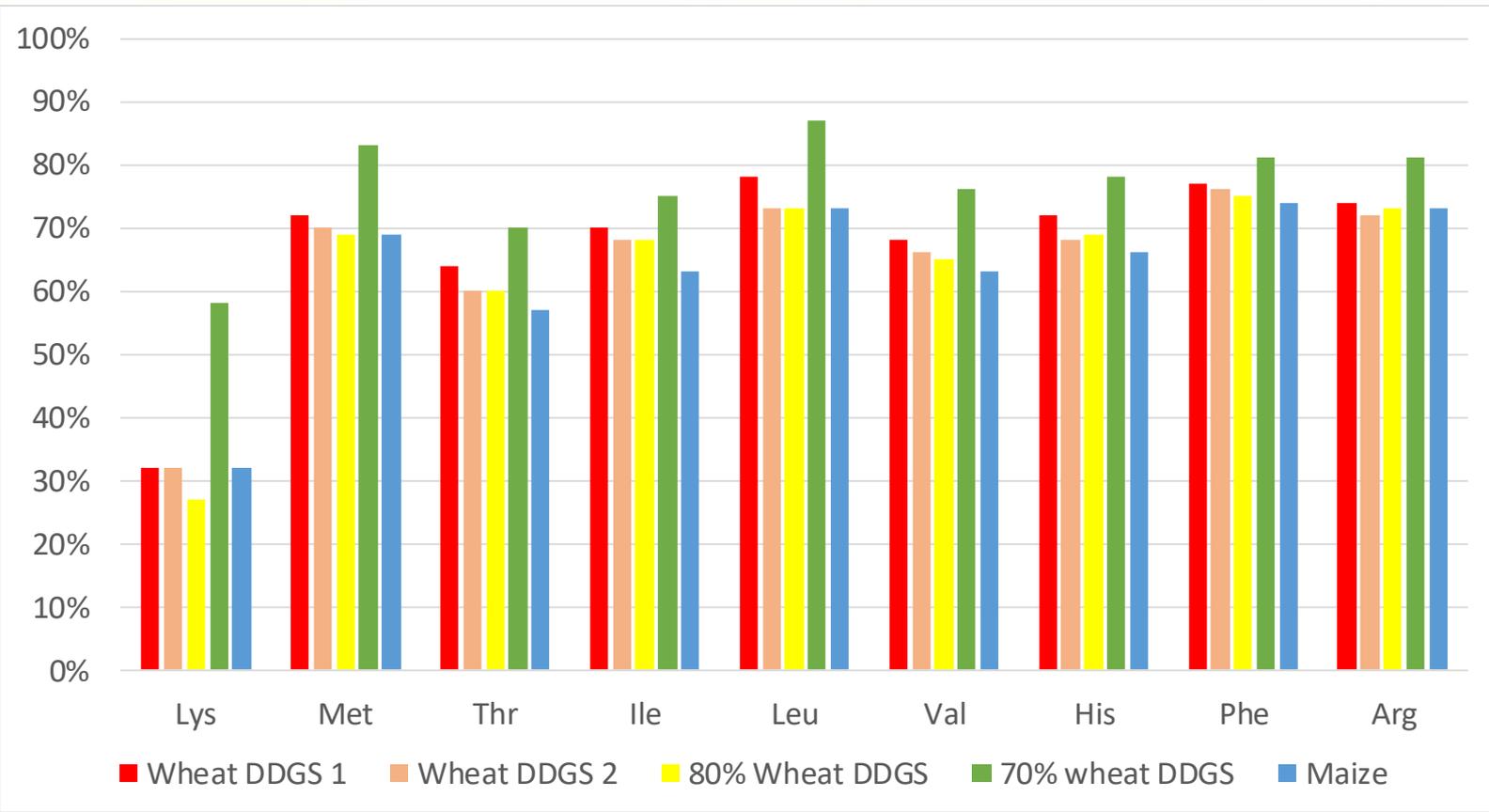
Antinutrient	Fullfat soya	High Pro SBM	Fermented soybean meal	SPC
Trypsin inhibitor mg/g protein	10-25	4-8	3-8	2-3
B-conglycinin mg/g	50-100	10-50	1-10	<0.002
Stachyose (%)	4 – 4,5	4.5 – 5	1-5	1-3
Raffinose (%)	0.8 - 1	1-1.2	0.2-1.2	<0.2
Phytic acid (%)	0.6	0.6	1.6	0.6

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

Stay informed on the feed industry via Twitter (@FEFAC_EU) & the FEFAC NewsFEED

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Europäischer Verband
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European Feed
Manufacturers' Federation

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PRESS RELEASE: FEFAC Calls on @EU_Commission to Strengthen Competitiveness of EU Livestock & Feed Sector fefac.eu/files/66820.pdf

press release for a detailed analysis of the compound feed estimates of 2015 and a more in-depth market outlook for 2016.', 'Circular Economy Package proposes Exclusion from Waste Legislation for Feed', and 'Oliveeet meals and former foodstuffs clearly identified as non-waste'. At the bottom, it says 'On 2 December 2015, the European Commission published the long-awaited Circular Economy Package, which included...'. Contact information at the bottom: FEFAC also European Feed Manufacturers Federation Rue de la Loi 223 boîte 3 B-1040 Bruxelles. Phone: +32 2 285 00 50, Email: fefac@fefac.eu, Website: www.fefac.eu."/>

FEFAC
NewsFEED
#1
11 February 2016

EU Feed Industry raises Profile Animal Nutrition in 2016
XIV FEFAC Congress in Antalya "Societal acceptance of livestock and feed production in the EU"

FEFAC and its Turkish member association Türkiye-Bir will submit the annual [Circular Economy Package](#), taking place in Antalya, Turkey on 21-22 April 2016. The event will focus on the holistic policy approach the European Commission presented in the Circular Economy Package to discuss the roadmap towards a more resource-efficient food and feed chain management. Key note speakers from the EU institutions and feed & food chain partners will discuss the societal benefits of introducing new animal nutrition solutions, while safeguarding the high EU feed safety standards. Other dedicated sessions will discuss current developments in LCA methodology for environmental footprint calculations of feed production as well as soy value chain efforts and commitments in North- and South-America to produce and deliver responsible feed materials to the EU feed industry.

FEFAC/FEFANA Conference "Innovation in Animal Nutrition" on 9 June 2016
FEFAC and FEFANA will hold a first invitational joint high-level stakeholder EU Conference on "Innovation in Animal Nutrition" in Brussels on 9 June 2016. The two European feed industry organisations will present their visions of a modern industry where central roles are played by innovation and public-private partnerships, which are key to shaping a smart, resource efficient Europe and meeting the EU Commission objectives on jobs, growth and investment. The event aims at highlighting the need to foster the practical application of innovation in animal nutrition. FEFAC and FEFANA members are convinced that animal nutrition can further assist the EU livestock sector in

addressing major global challenges such as climate change and antimicrobial resistance if more efforts are made to tackle EU regulatory bottlenecks.
A provisional draft programme of the "Innovation in Animal Nutrition" Conference on 9 June 2016 will follow shortly.

156.1 Million Tonnes Compound Feed Produced in 2015 compared to 2014 - Market outlook 2016 pessimistic
Compound feed production in the EU-28 reached an estimated level of 166.1 million tonnes in 2015, according to data provided by FEFAC members. This is a 0.2% increase compared to 2014. Feed costs remained low and even decreased compared to 2014, due to a good 2015 cereals harvest in the EU both in terms of quantity and variety status. In addition, there was a largely sufficient supply of oilseed meals globally, especially soybean meal. This compensated the still decreasing pigmeat quotations to a certain extent, at a time when pigmeat production continued to increase by close to 1% in 2015. FEFAC market experts share a more bullish outlook concerning industrial compound feed production in 2016, foreseeing a significant reduction in pig feed demand. See FEFAC's [press release](#) for a detailed analysis of the compound feed estimates of 2015 and a more in-depth market outlook for 2016.

Circular Economy Package proposes Exclusion from Waste Legislation for Feed
Oliveeet meals and former foodstuffs clearly identified as non-waste
On 2 December 2015, the European Commission published the long-awaited Circular Economy Package, which included

FEFAC also
European Feed Manufacturers Federation
Rue de la Loi 223 boîte 3
B-1040 Bruxelles
+32 2 285 00 50
fefac@fefac.eu
www.fefac.eu

www.fefac.eu

