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Processed Animal Proteins & Phosphorus Safe and Sustainable resources

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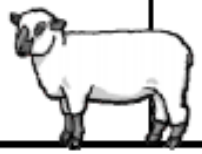
Introduction

- EFPRA
- Processed animal proteins (PAP)
- Phosphorus
- Sustainability
- Carbon Footprint
- Conclusion

What is EFPRA?

- **European Fat Melters and Renderers Association**
- EFPRA represents two independent business lines:
  - Fat melters, dedicated to human food industry
  - Renderers, dedicated to the collection of animal by-products not intended for human consumption.
- EFPRA has 29 members in 24 European countries (EU and EFTA countries).
- EFPRA represents about 300 companies (500 factories) which all together produce nearly 4 Mill To of animal fats and animal by-products on a yearly basis and employ about 17,000 people.
- In the EU nearly 16,0 Mill To animal by products are processed annually.

Where do Animal By Products come from?

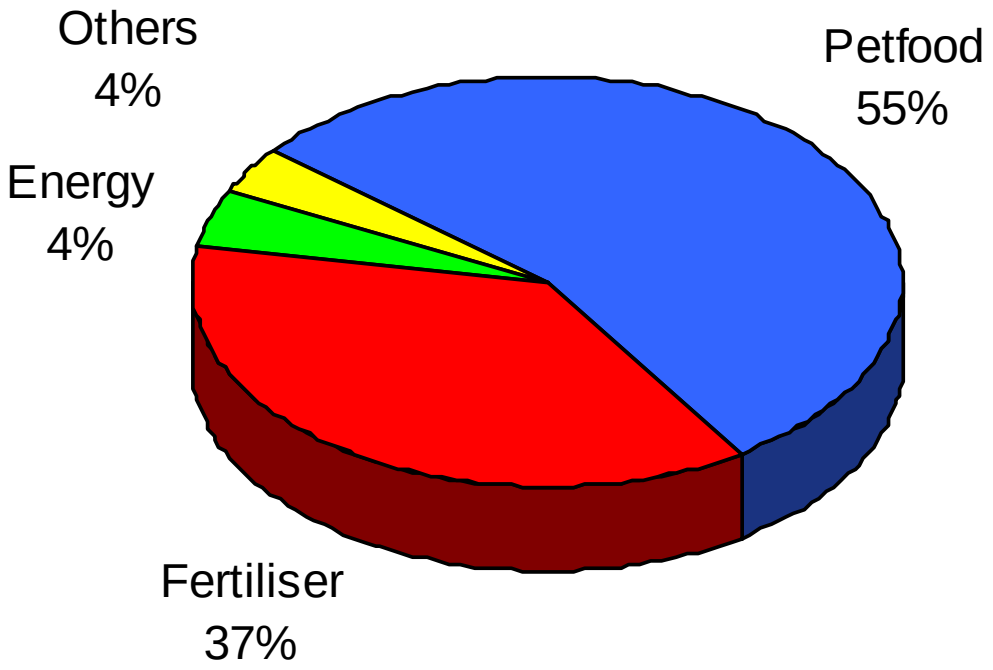
Slaughtered animal	human consumption (%)	**by products (%)**
Chicken 	68	**32**
Pig 	62	**38**
Cow 	54	**46**
Sheep / Goat 	52	**48**

VAN VUURE (2005)

Use of Processed Animal Proteins (PAP)

- In 2008 ca. 2,3 Mill To processed animal proteins (PAP) were produced from category 3 material (fit for human consumption)

- Markets 2008:
  - 1,26 Mill To Petfood
  - 850.000 To Fertiliser
  - 100.000 To Energy
  - 90.000 To Others



Potential of PAP

- Assuming that only high proteinaceous PAP (blood, greaves, poultry meal, ca. 500.000 to) are normally used in petfood 1,8 Mill To of PAP are not used in feed.
- Assuming 50% Protein content means that 900.000 to pure proteins are not used as feed and must be replaced.
- Assuming 60 g P / kg PAP about 108.000 to P are not used in feed and must be replaced.
- In 2004 EPEA calculated that for the replacement of 2,1 Mill To animal proteins in the EU by 3,2 Mill To Soya beans 20.000 km^2 (or 2 Mill Hectare) of agricultural land is additionally needed.
- Additional problems due to that: deforestation, erosion, loss of biodiversity, monoculture, GMO, etc.

Lift of the feed ban

- In 2000 after the second BSE crisis the feed ban was introduced to ban the use of animal proteins in all diets. PAP ist still considered as feed but not allowed for farmed animals.
- In 2005 DNV made a risk assessment about the risk of lifting the feed ban. Calculated on the BSE-incidence of the previous years DNV stated that even an inclusion rate of 2 % ruminant material will not lead to an increase of BSE cases.
- Today the BSE incidence is fallen on a low level and the category 3 processing plants are efficiently restructured to exclude ruminant material.
- Modern analyse technologies (PCR, ELISA etc.) can already guarantee today a qualitative detection threshold of 2 % ruminant material in PAP.
- **Non-ruminant PAP can be safely used in diet for non-ruminants**

EFPRA Approach: Aquafeed in the first step

- EFPRA approach foresees additional barriers to avoid cross contamination on every step of the feed chain:
  - Dedicated slaughter houses / cutting plants
  - Dedicated category 3 processing plants
  - Dedicated Aquafeed mill (no ruminant feed)
  - Dedicated fish farmers (without ruminants)

- The ban of the intraspecies recycling must not be supervised!

„Phosphorus - as important as air, as scarce as oil?“

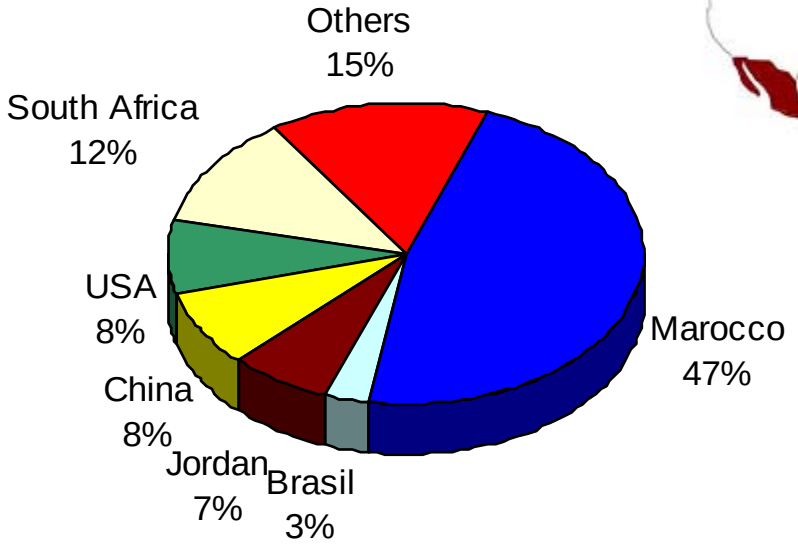
- in nature mostly as phosphate
- 0,1 % in the lithoshere (earth crust)
- Available only for the next 50 – 130 years
- Often Cadmium and Uranium polluted
- Price of phosphorus increased by the factor of 20 between 2000 and 2008 due to increased demand for phosphates (fertilizer!)

- >100 Mill To rock phosphate explored annually
- 1 Mill To P accordingly

- 85 % of total phosphorus in animals are deposited in non edible parts of slaughtered animals (Kamphues 2009)
- PAP can substitute 10% of the annually needed P

Phosphorus: Safe Access?

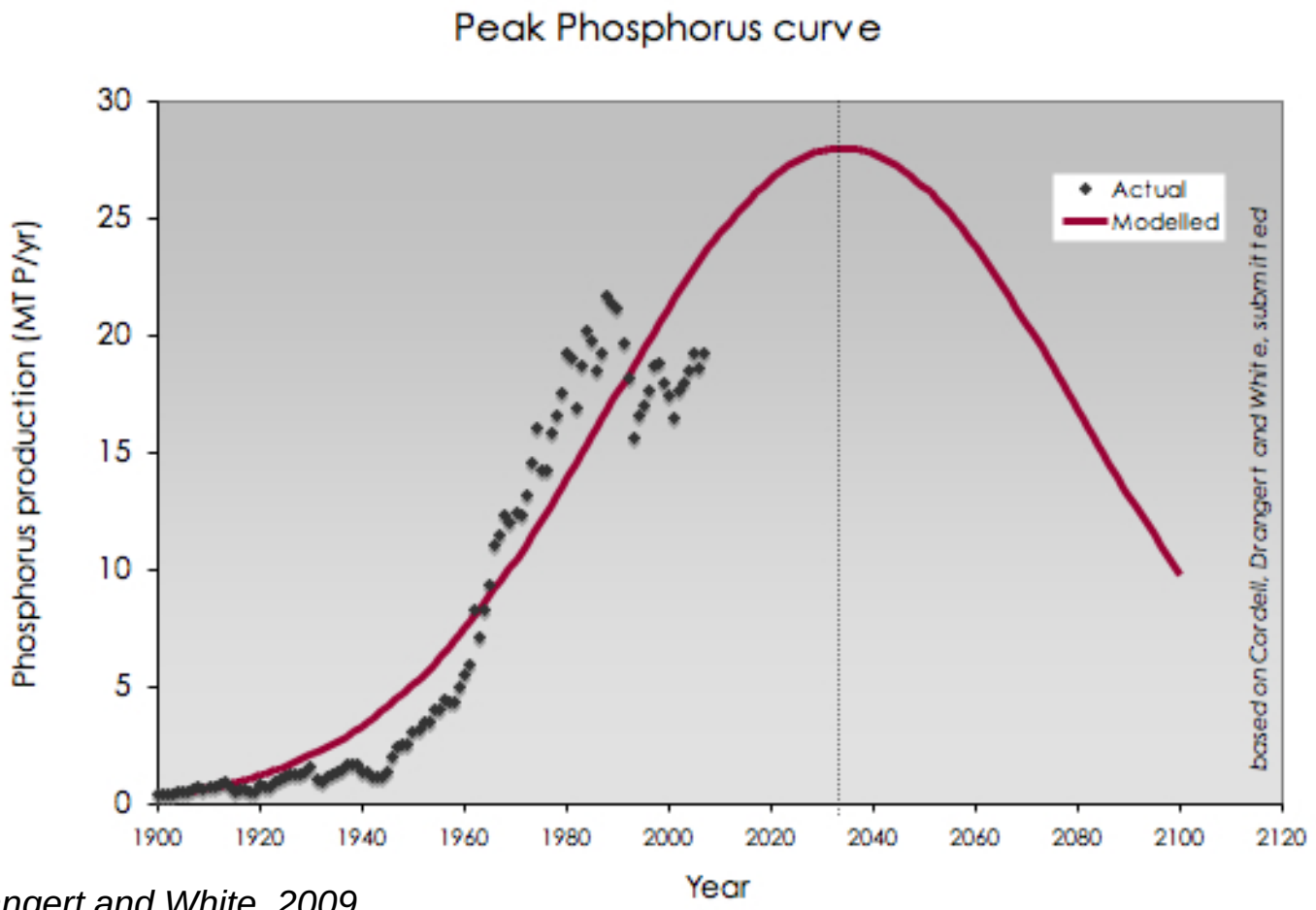
- P-reserves in the world



Source: „Die Zeit“ 2005

Source: Wagner et al. 2007

Phosphorus production



Cordell, Drangert and White, 2009

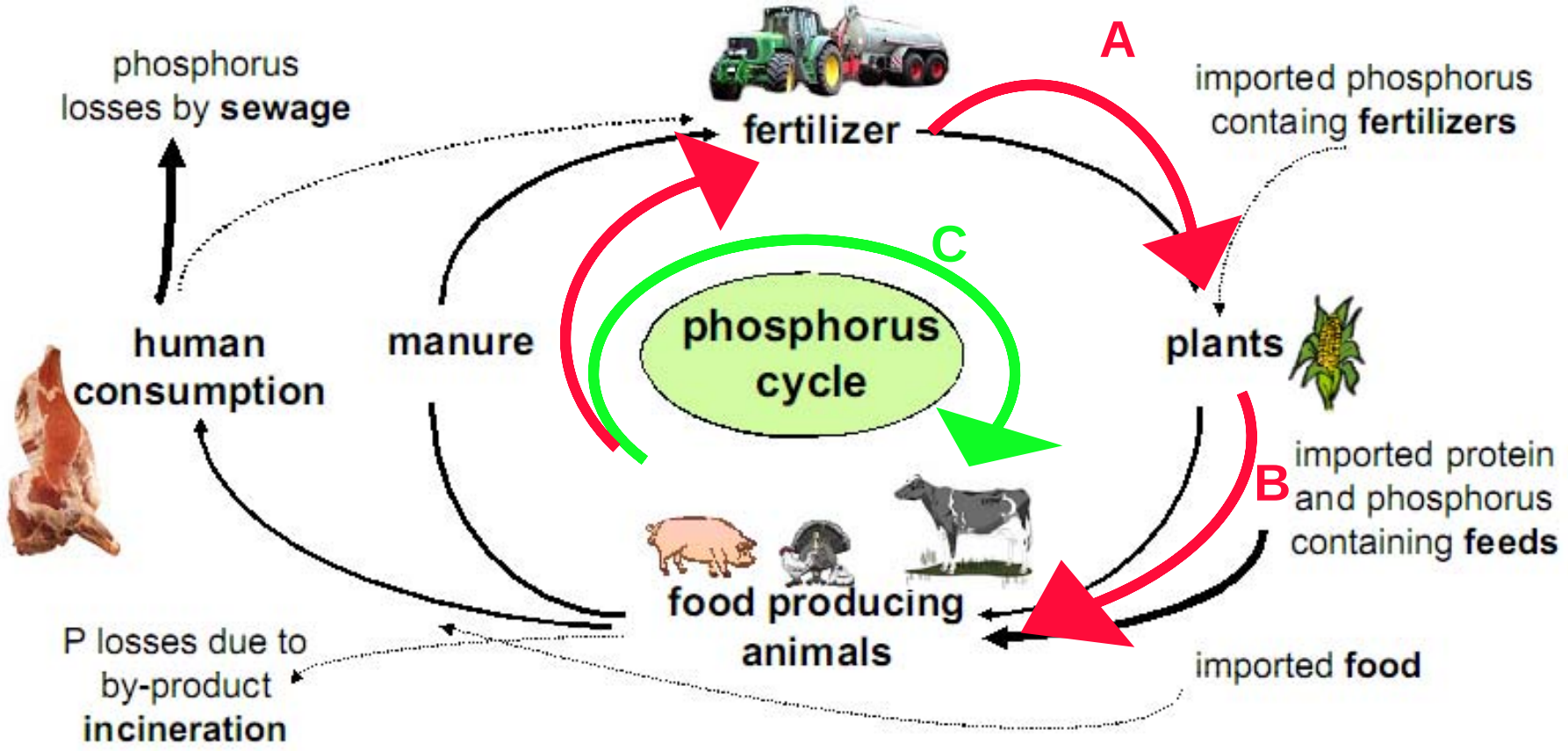
Availability of phosphorus from various feed ingredients in pigs

→ Committee for Requirement Standards of the Society of Nutrition Physiology, Germany (2006)

source	P content (g/kg dm)	app. digestibility (%)	app. digestibility (%) with added phytase
barley	4.4	45 ± 11	66 ± 11
wheat	3 – 4	68 ± 6	71 ± 6
corn	2.8	18 ± 9	62 ± 3
soybean meal, extr.	~ 7.0	33 ± 6	73 ± 7
rape seed meal, extr.	~ 7.5	37 ± 2	73 ± 4
fish meal	~ 26	88 ± 7	no need
meat/bone meal	28 – 37	82 ± 11	
bone meal	71	80 ± 7	
Mono-Natrium-Phospate	250	96 ± 2	no need
Di-Calcium-Phosphate	214	87 ± 3	

Source: Kamphues 2009

Phosphorus cycle



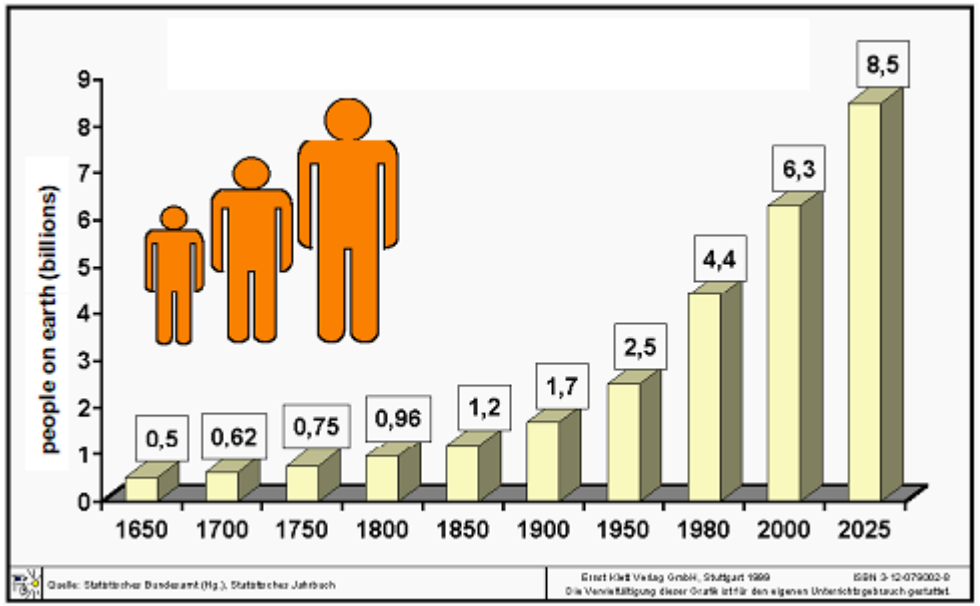
A) P-Loss due to erosion, leaching, plant availability, crop loss etc.: 50%

B) P-Loss due to P digestibility: 30 – 70% (with / without phytase)

C) P-Loss due to digestibility: < 20%

Importance of P and Proteins

- Growing population means
  - Growing demand for food
  - Growing demand for high quality food (meat, milk, eggs, fish)
  - Growing demand for feed



	now	2050	Increase (%)
People on earth (billions)	**6.5**	**9.0**	**+ 38**
Meat production (million tons)	**229**	**465**	**+ 103**
Milk production (million tons)	**580**	**1043**	**+ 80**

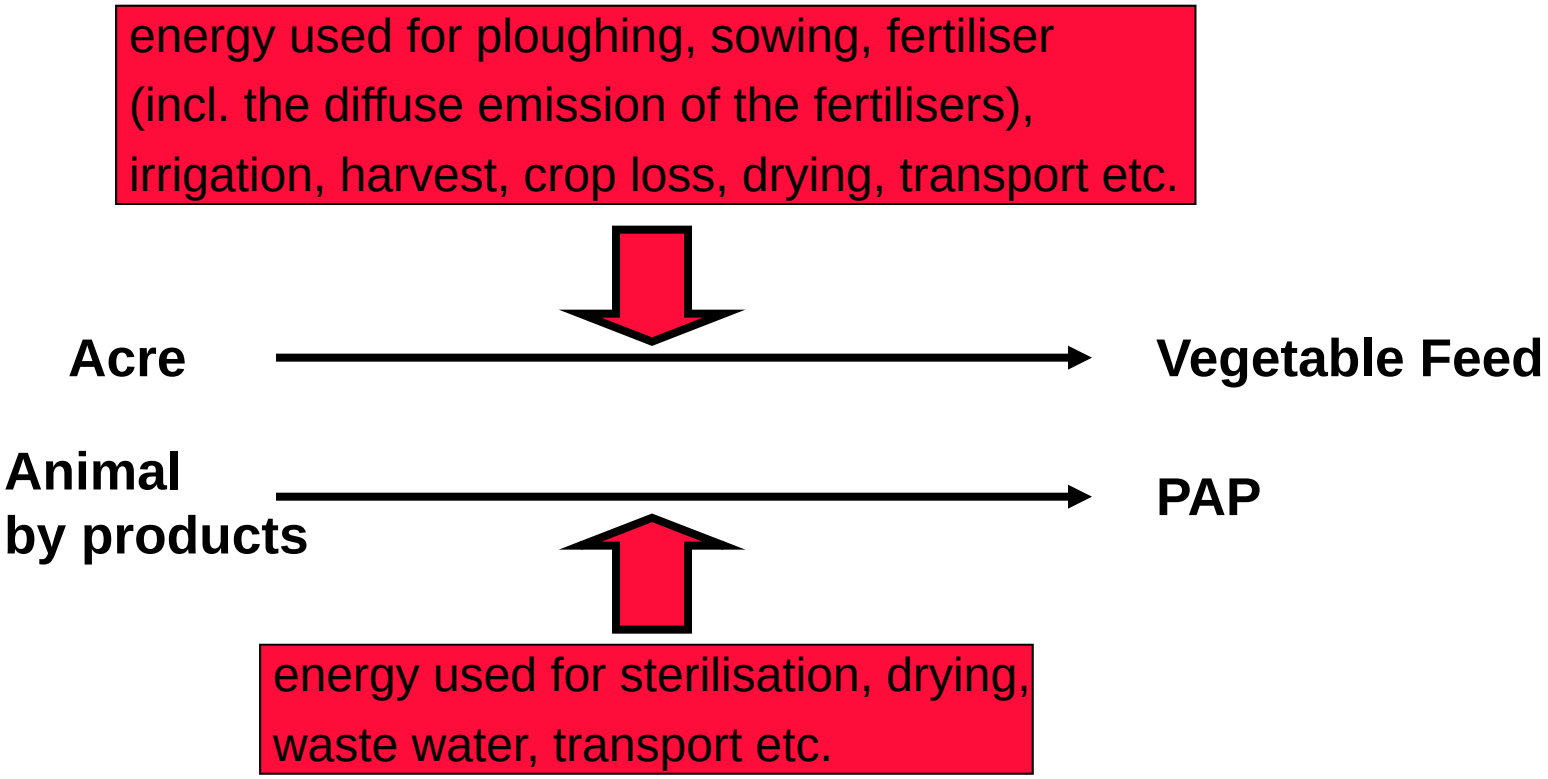
Steinfeld et al. 2006

Sustainability

- „Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs“ (*World Commission on Environment and Development*, 1992)

Carbon footprint of proteins

- The carbon foot print (CFP) shows the release of CO_2 to the atmosphere during the production of a product.



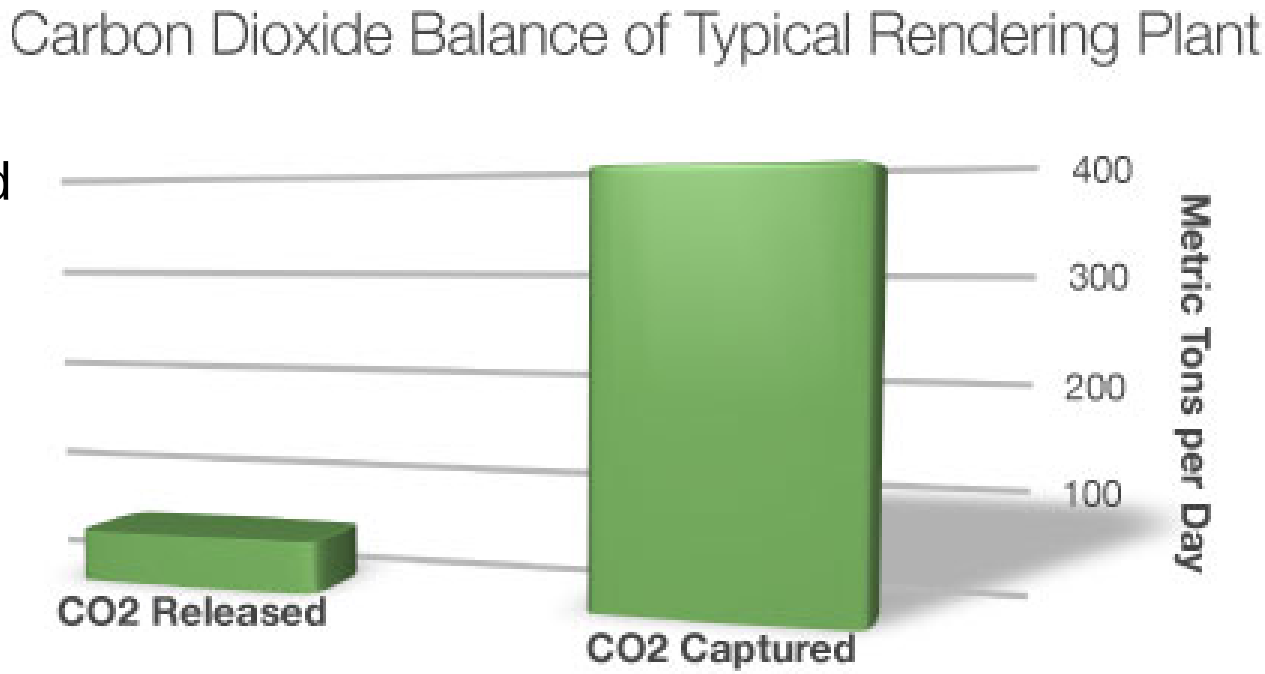
A life without rendering?

- **<u>What happens if animal by products are not rendered?</u>**
- Animal by products are then
  - dumped, ⟶ uncontrolled decomposition
  - landfilled or ⟶ uncontrolled decomposition
  - burnt! ⟶ Fossil energy needed

- During the uncontrolled decomposition / decay the animal by products do not only exhaust CO_2 but also methane, N_2O which both are more harmful to the climate than CO_2. Methane is 21 times and N_2O is 298 times more harmful than CO_2.
- Even if not all organic material is decomposed the impact on the climate is worse.
- PAP not used as feed must be replaced by vegetable proteins.

Carbon Footprint of Rendering

- The NRA (National Rendering Association, USA) calculated the impact of a typical rendering plant on the climate divided in energy used and GHG captured



- On a daily basis 50 to CO_2 released for energy faces 400 to CO_2 captured.
- This calculation does not include the substitution of the protein loss with vegetable proteins.

Carbon Footprint – A philosophical / theoretical approach only?

- Tesco, an English retailer (no. 4 in the world), already calculated the Carbon Footprint of the company and of some products (for example milk).
- The Renewable Energy Directive (2009) used the calculated GHG avoiding potential to benchmark biofuels. Biodiesel made from animal fats has the highest GHG-saving potential:

- Rapeoil methylester	38%
- Sojaoil methylester	31%
- Waste vegetable and animal oil methylester	83%

- This means that for Soja Biodiesel 4 times more fossil carbon is emitted than for Animal fat Biodiesel.

Animal by products – a sustainable protein and phosphorus resource

- CFP of any product will become more and more of public interests.
- The international feed and food industry has to face sustainability criteria seriously.
- For the production of food of animal origin the composition of feed can play a major role reducing the GHG impact. Sustainable feed like PAP (processed animal proteins) can help to reduce the CFP in the feed chain.
- In the future it will be essential to responsibly manage any natural resources. WWF proposes already the introduction of a water footprint.
- The limited resource phosphorus will force us to recycle phosphorus on the highest possible level instead of wasting it.

Thank You very much for Your attention!

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