Raw material market development of inorganic feed phosphates

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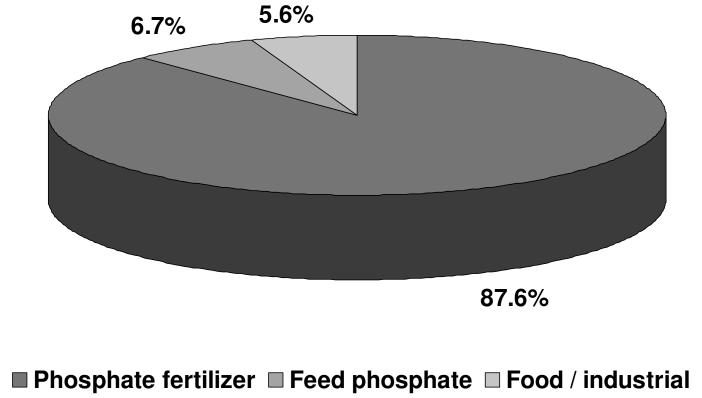
Overview

- Phosphate world
- Production process monocalcium phosphate
- Driving forces of the raw material market
  - Demand
  - Supply
- Effect on feed phosphates
- Some small tips

World phosphate production

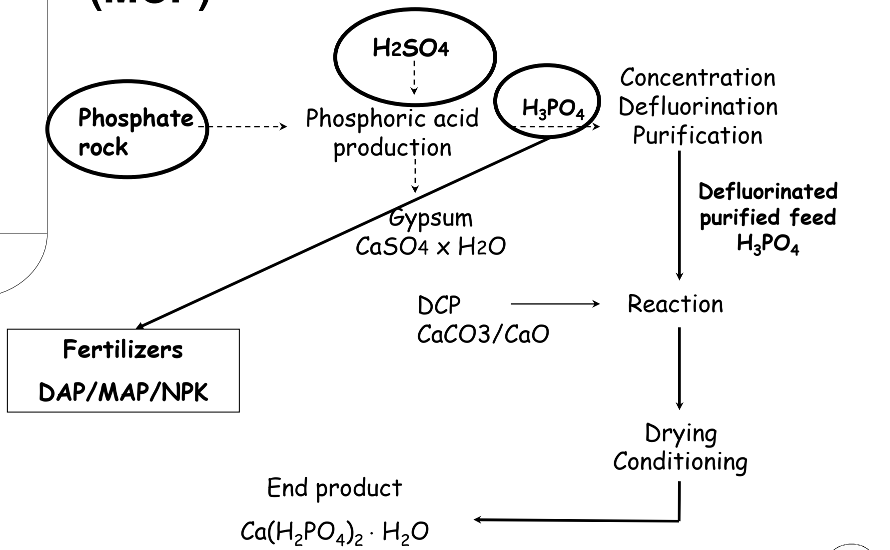
44.5 mio MT P2O5

7 mio MT DCP



Raw material availability and price of raw materials is determined by the fertilizer industry.

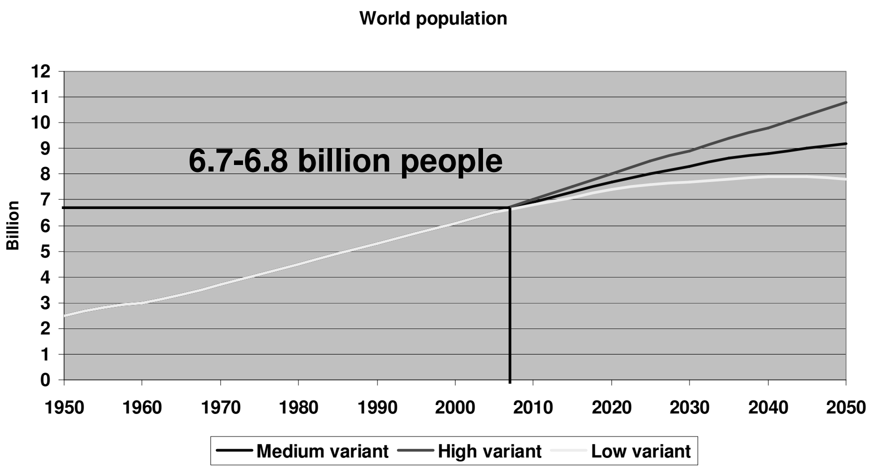
Production of monocalcium phosphate (MCP)



Driving forces of the raw material market of fertilizer phosphates

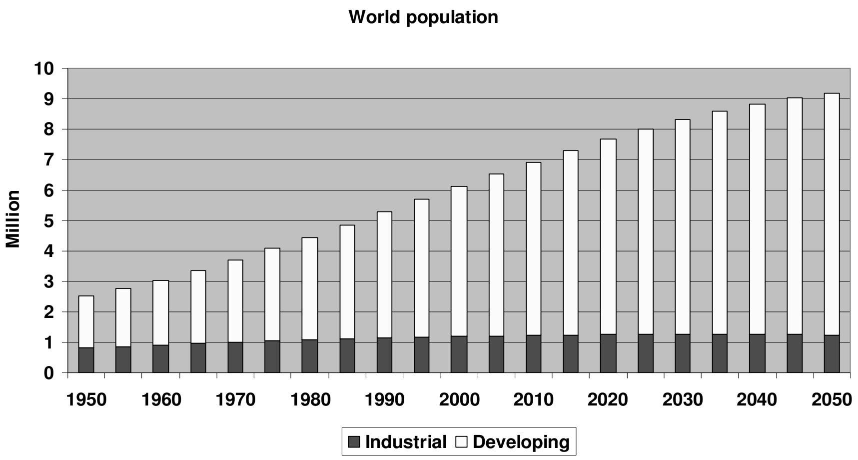
- Demand
  - Meat consumption
    - Global population increase
    - Global rise in Per Capita Income
  - Biofuel development
  - Effect on cereal consumption
  - Effect on the use of P fertilizers

Global population increase



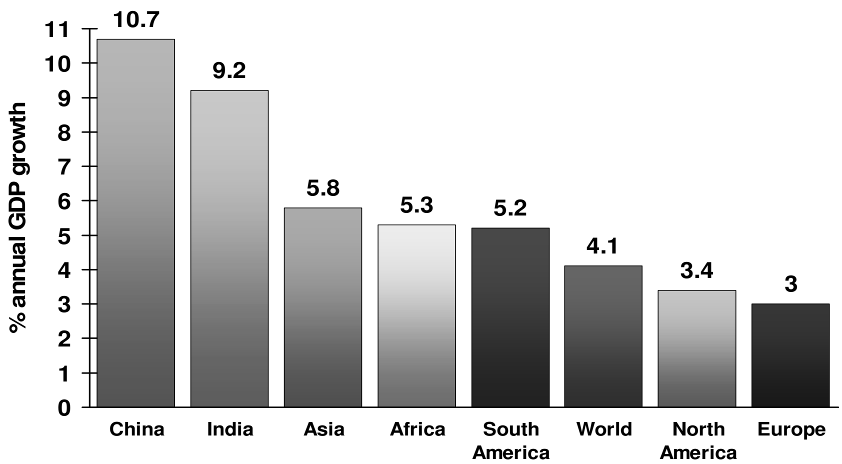
Source United Nations

Global population increase



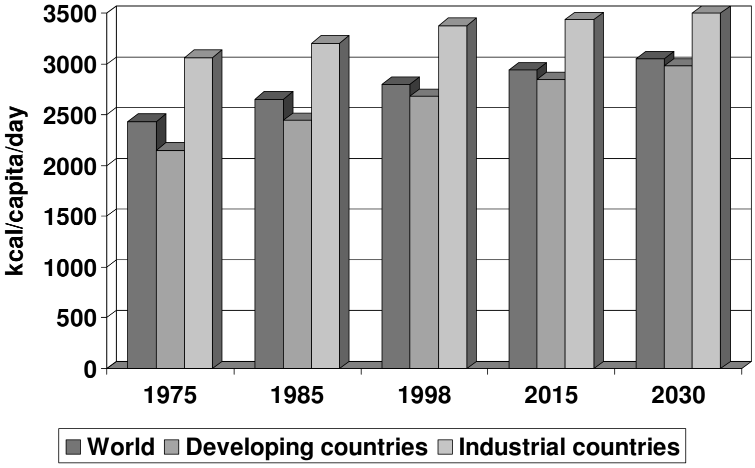
Source United Nations

World economic growth (2006)



Source United Nations

World food consumption / capita



Source FAO

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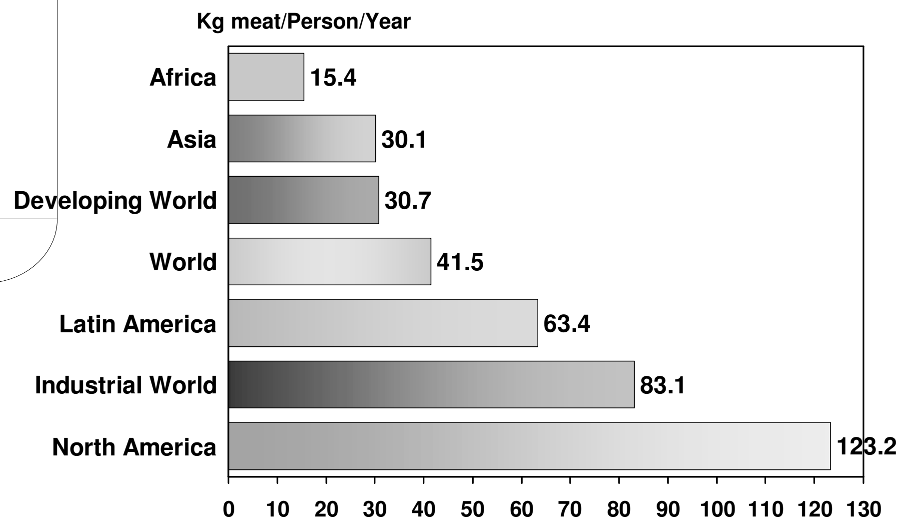
Meat consumption / capita (2006)



Source FAO

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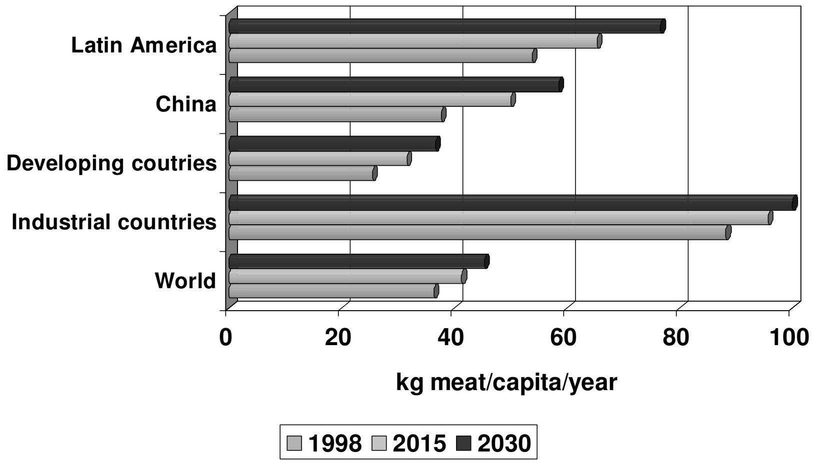
Meat consumption / capita: trend



Source FAO

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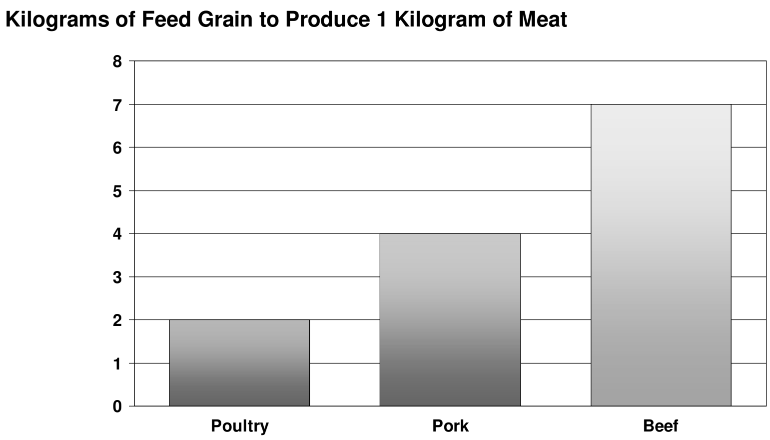
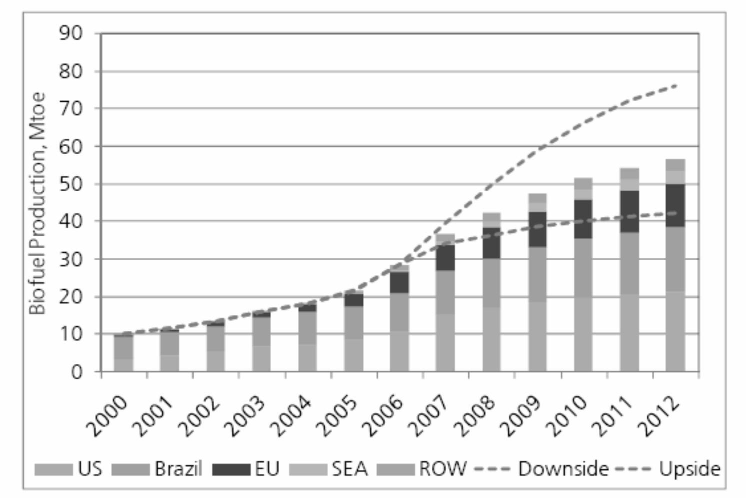
Feed grain consumption for meat production



Increased meat consumption
=> strong effect of cereal production

Source: Doane, PotashCorp

Biofuel production forecast



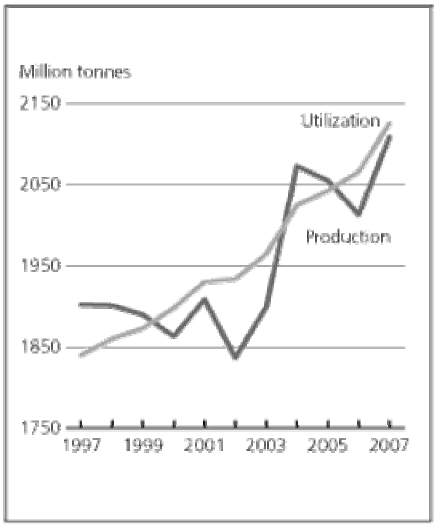
Source Integer

Demand: conclusions

- World population is further growing
- Areas with highest population growth show also strongest % annual GDP growth
- Food and mainly meat consumption is further increasing
- Biofuel production is still increasing (2nd generation?)

=> Consumption of cereals has increased rapidly!

World cereal production and utilization



Source FAO

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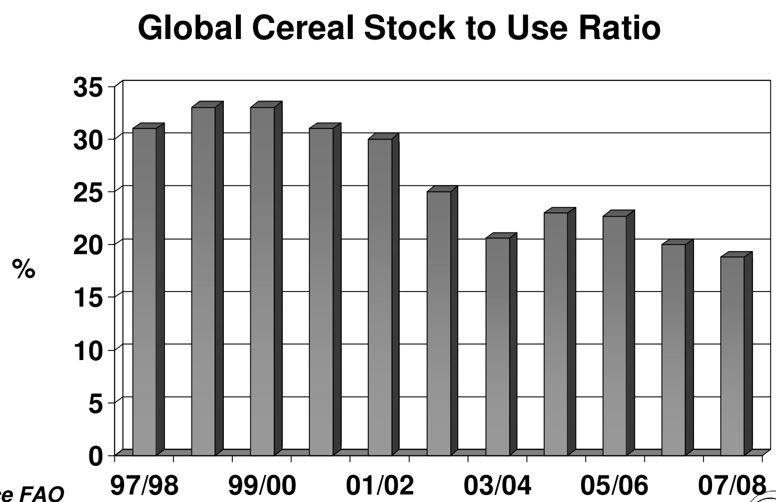
Cereal stocks are historically low



Source FAO

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Phosphate fertilizer demand

- As a result of the strong cereal production growth:
  - Consumption of P fertilizers increased over the last years with a strong increase during 06/07 (+5.1%) to 38.6 mio T P2O5
  - Strong and continued growth expected in Brazil and South-East Asia
  - Future global growth of P fertilizers (IFA forecast)
    - +3.8% in 07/08
    - +3.3% in 08/09
  - China installed a MAP/DAP export tax of 135% during 2008

Source IFA

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Driving forces of the raw material market of fertilizer phosphates

- Demand
- Supply
  - Phosphate rock
  - Sulphur
  - Phosphoric acid
  - New capacities

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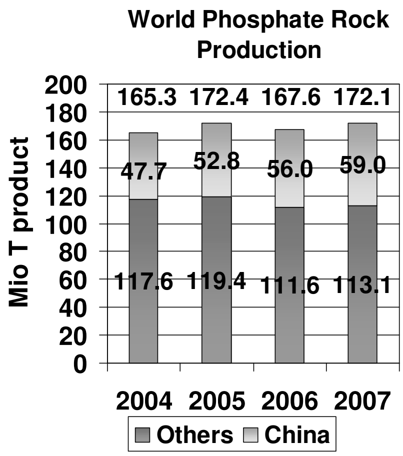
Supply of Phosphate Rock

- World Phosphate Rock production: 4% increase in 2007 ⇔ 2004
- Trade estimated at 31.5 mio T in 2007 (2% increase compared to 2004)
- P content of rock declining (31.6 => 31.3% P205)
- 2007: export tax of 20% on Chinese rock: export down



Source IFA

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Supply of Sulphur

- Due to the strong fertilizer market, the global sulphur market increased heavily in 2007.
- Export constraints from Canada due to logistic problems and strong winter
- Chinese sulphuric acid producers changed their process from pyrite to sulphur
- No large inventories available

=> Imbalance supply/demand situation in 2007

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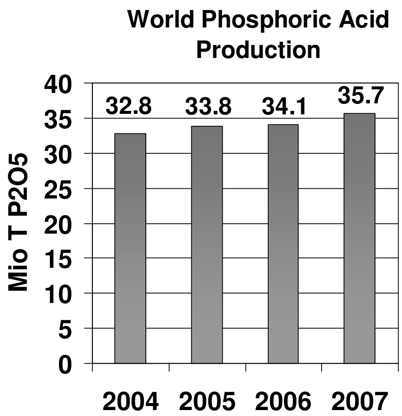
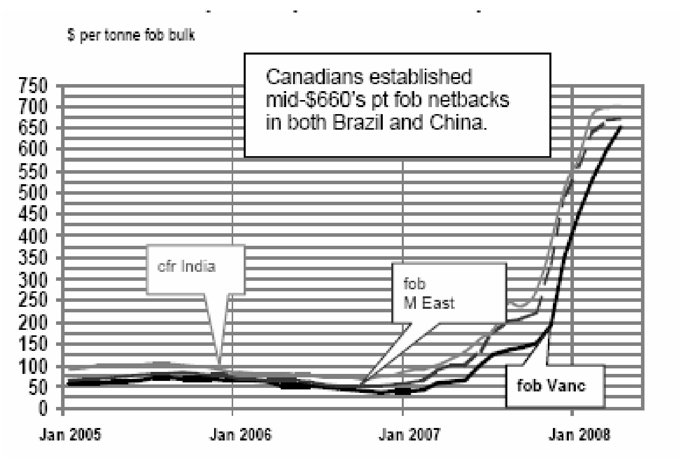
Supply of Phosphoric Acid

- Increase in phosphoric acid production but lower trade: 2% decrease in 2007 ⇔ 2004 (estimated at 4.8 mio T P2O5) due to more domestic downstream processing
- The global supply/demand of phosphoric acid showed a virtual balance in 2006 and a marginal surplus in 2007
- In 2008, the growth of demand would match that of supply, keeping the current balance tight
- Sulphur!



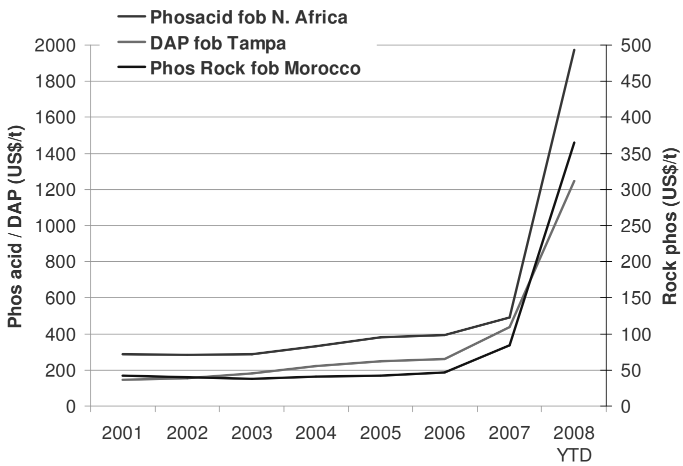
Source IFA

Sulphur Spot Price Comparison



Source Fertilzer Week

P raw material prices



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Future: new phosphate capacity

- Start-up of Ma'aden project in Saudi Arabia: 3 mio MT DAP; target date Q4 2010
- Morocco: 2 new phosphoric acid plants
- Algeria: increase phosphate rock production
  - 2008: 2.5 mio MT
  - 2010: 4 mio MT
  - 2012: 9 mio MT rock
- Brazil (new and expanded phosphoric acid/ MAP capacity)
- Tunisia/Egypt/Jordan: one new plant each
- Possible new capacity in FSU China: continued growth; several capacity expansions and new plants & rationalization of smaller plants

Source British Sulfur / Phosphates 2008 conference

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Supply: conclusions

- For most raw materials, demand was higher or almost equal to supply => tight situation with strongly increased prices
- New P capacities come on stream
  - Brazilian, Chinese & Russian new P capacities mainly for local consumption
  - Biggest projects on stream from 2011

Effect on feed phosphates

- Feed phosphate market marginal compared with fertilizer market
- 2007: better prices in fertilizer market ⇔ feed
- Early 2008: high prices of sulphuric acid, phosphate rock and phosphoric acid => feed phosphate prices had to follow raw material prices
- 2nd half 2008: due to Chinese export tax: raw materials for phosphates remain tight and further increase of price is possible
- 2008-2010: raw material prices expected to remain strong

Tips for the use of feed phosphate

- Use correct P values
  - Aliphos Monocal 22.9% P ⇔ 22.6%: Δ 13€/T
  - Aliphos Dical 18.2% P ⇔ 18%: Δ 8€/T
  - TC sends around monthly analyses (e.g. Aliphos Monocal results 2007)

ANALYSIS/MONTH		AVERAGE	MINIMUM	MAXIMUM	STAND.DEV.	TYPICAL
P total	%	*22.91*	*22.81*	*23.06*	*0.08*	*22,9 (□=0,15)*
P sol/citrate	%	*22.54*	*20.92*	*23.01*	*0.55*	-
P opl.citrate/total	%	*98.4*	*91.4*	*100.8*	*2.5*	*98.0*
P sol/citr.ac.	%	*22.79*	*22.53*	*23.10*	*0.16*	-
P opl.citr.ac./total	%	*99.5*	*97.9*	*101.1*	*0.8*	*99.0*
P sol/water	%	*17.60*	*17.40*	*18.08*	*0.22*	-
P opl.water/total	%	*76.8*	*75.6*	*78.6*	*1.0*	*80.0*
CaO	%	*24.3*	*23.8*	*24.6*	*0.2*	-
Ca	%	*17.35*	*17.01*	*17.57*	*0.17*	*16.65*
F	%	*0.11*	*0.09*	*0.13*	*0.01*	*0.10*
H2O	%	*0.77*	*0.58*	*1.04*	*0.14*	*1.00*
pH in H2O	1% sol	*3.7*	*3.5*	*3.8*	*0.10*	*3.7*
As	ppm	*5.8*	*4.4*	*7.6*	*1.1*	*6.0*
Pb	ppm	*2.5*	*2.10*	*3.4*	*0.4*	*4.0*
Cd	ppm	*4.3*	*3.1*	*5.3*	*0.8*	*4.0*
Hg	ppb	*<7*	*<1*	*16*	-	*10.0*

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Tips for the use of feed phosphate

- Use correct digestibility figures: e.g. DLG values
  - MCP: 90% (Aliphos Monocal)
  - DCP: 70%

However: test FAL 2007

  - DCP2H20: 80% (Aliphos Dical / rock production process)
  - DCP0H20: 72% (Italphos Dical / phosphoric acid production process)
  - CaMgP: 84% (Aliphos Monomag)

DCP at 80% ⇔ 70%: Δ 75€/T

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Digestibility figures Tessenderlo Feed Phosphates

Phosphate	g P / KG	PIGS		POULTRY	
		% DIG. P	g DIG. P	% DIG. P	g DIG. P
DCP					
Aliphos Dical	182	80	145.6	80	145.6
Italphos Dical	180	72	129.6	75	135.0
Windmill Dicalphos	200	72	144.0	73.5	147.0
MDCP					
Aliphos / Italphos Modical	219	83	175.2	82	175.2
MCP					
Aliphos / Italphos Monocal	229	90	206.1	85	194.7
Monomag (CaMgP)	200	84	168.0		

Thank you for your attention

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