Dairy and whey ingredients
- market and industry trends

Chicago - April 27, 2010
Tage Affertsholt, 3A Business Consulting
3A Business model

- **Strategy and business development for all elements of the food value chain**

- **Key competences within functional foods, health & wellness and ingredients**

- **Core structure - global network**

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**3A Business Consulting**

- Knowledge centres
  - Universities/CRO
  - Information

- Associate consultants
  - Scandinavian
  - International

- Supplying industry
  - Strategy and concept

- Processing industry
  - NPD / Innovation

- Distribution industry
  - Marketing, PR and positioning

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**Total value chain competence**
Dairy and whey ingredient-related reports


November 2008

3A Business Consulting


March 2009

3A Business Consulting


– Hydrolysates, Peptides and Fractions –

November 2009

3A Business Consulting
Dairy ingredient overview

Milk ingredients
- Milk as raw material
- SMP
- WMP
- Casein
- Caseinates
- Micellar casein
- MPC
- MPI

Whey ingredients
- Whey as raw material
- Cheese
- Casein
- WP
- DWP
- WPC35
- Lactose Permeate
- WPC80
- WPI
- Minerals
- Lactose-pharma
- WPH
- Peptides
- Protein fractions
- Phospho-lipids
- Lactose derivatives

Applications
- Pharma
- Nutrition
- Health care
- Personal care
- Food
- Feed

Note: Cheese and butterfat as an ingredient is not included in respective 3A reports, although an important market.
1. Introduction
2. Dairy and whey ingredients – market overview
3. Dairy and whey ingredients – production/trade trends
4. Dairy and whey ingredients – industry trends & outlook
Milk production vs. exports and imports 2008

Source: EU Commission
Imports of dairy products 2008

(in million tonnes of milk equivalent)

- **Mexico**: 2,578
- **China**: 2,317
- **Russia**: 1,623
- **Japan**: 1,576
- **United States**: 1,245
- **Brazil**: 732
- **Australia**: 546
- **Canada**: 236
- **Switzerland**: 368
- **New Zealand**: 90
- **Pakistan**: 91
- **Ukraine**: 150
- **Argentina**: 22
- **India**: 9

Source: EU Commission
Imports of dairy products in % of national production 2008

Source: EU Commission
Global production of milk ingredients 2008

**Total production**

- 2005: 7200 MT
- 2006: 7400 MT
- 2007: 7600 MT
- 2008: 7800 MT

**Growth CAGR 2.4%**

**Regional production in 2008**

- Europe: 25%
- Asia-Pacific: 23%
- Latin America: 16%
- Oceania: 18%
- North America: 12%
- Eastern Europe: 6%

Source: 3A Business Consulting
Global production of milk ingredients 2008 - per main category

- SMP
- WMP
- Casein/caseinate
- MPC/MPI

- Size of blue circles indicates market size
- Other milk ingredients can be found, however volumes are comparatively small
- Total production volume approx. 8,300,000 MT

- In 2008 the global milk ingredient market was worth roughly USD 19 billion.
- Between ‘05-‘08, market volume up 2-3% p.a. and market value up by 27%

Source: 3A Business Consulting
The global whey protein market was worth roughly USD 3.8 bio in 2008.

Between ‘05-‘08, market volume up 3% and market value up by 24%.
Global market share and growth rates of the major whey ingredients 2008

- Volume of approx. 770,000 MT
- Total annual growth of approx. 6% between 2005 and 2008
- High value-added ingredients have seen the largest growth
Global lactose products market 2008

In 2008, the global lactose products market was worth roughly USD 1.5 billion.

Between ‘05-’08, market volume up 8% and market value up by 25%.

Source: 3A Business Consulting
Within dairy proteins casein/caseinate has been challenged by WPC and MPC

- Casein/caseinate has declined by approx. 3% p.a. between ‘05 and ‘08
- MPC (42-85%/MPI) has grown on average p.a. by 17% between ‘05 to ‘08
- WPC80/WPI has grown by ~20% p.a. over the period shown

Source: 3A Business Consulting
Bioactives are an emerging dairy ingredient category

The global market for dairy bioactive ingredients is minor, even when compared to other high-end dairy ingredient volumes.

Market volume is estimated to be approx. 33,000 MT and to be worth approximately USD 700 million in 2009.
Dairy bioactives seem to “cure all” modern lifestyle diseases

- Weight management
- Heart health
- Bone health
- Dairy Bioactives
  - Weight management: Whey proteins, Calcium, Glycomacropeptides, Conjugated linoleic acids
  - Heart health: Bioactive peptides, Calcium
  - Bone health: Calcium, Bioactive peptides, Milk Basic Protein - MBP®
  - Cognition, mood & stress: Bioactive peptides, Milk Fat Globule Membrane Phospholipids α-lac
  - Immune defense: Bioactive peptides, Immunomodulatory peptides, Lactoferrin, Osteopontin
  - Digestive health: Antimicrobial peptides, Immunoglobulins, Lactoferrin
  - Dental health: Bioactive peptides, Immunoglobulins, Lactoperoxidase, Glycomacropeptides, Caseinphosphopeptides, Osteopontin
## Dairy ingredient production trends 2009 vs. 2008

<table>
<thead>
<tr>
<th></th>
<th>EU</th>
<th>US</th>
<th>Oceania</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMP</td>
<td>+11%</td>
<td>-10%</td>
<td>+32%</td>
<td>+5%</td>
</tr>
<tr>
<td>WMP</td>
<td>-13%</td>
<td>-9%</td>
<td>+14%</td>
<td>-5%</td>
</tr>
<tr>
<td>Casein</td>
<td>-15%</td>
<td>N/A</td>
<td>+20%</td>
<td>+</td>
</tr>
<tr>
<td>MPC/MPI</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Whey</td>
<td>-8%</td>
<td>-2%</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Lactose</td>
<td>-3%</td>
<td>-3%</td>
<td>+</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: EU Commission, ADPI, EUPA, USDA and 3A estimates
EU total sales in 2009 were down 2% and stocks end 2009 down 28% vs. 2008
US total sales in 2009 were ±0 and stocks end 2009 down 29% vs. 2008
EU production trends in 2010: >+10% vs. 2009 end Feb
US production trends in 2010: +8% vs. 2009 end Feb
## Dairy ingredients – export trends 2009

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<th>USA</th>
<th>Oceania</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>SMP</td>
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<td>+55%</td>
<td>+12%</td>
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<tr>
<td>WMP</td>
<td>-7%</td>
<td>N/A</td>
<td>+28%</td>
<td>+6%</td>
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<tr>
<td>Casein</td>
<td>+4%</td>
<td>N/A</td>
<td>+13%</td>
<td>+</td>
</tr>
<tr>
<td>MPC/MPI</td>
<td>+</td>
<td>N/A</td>
<td>±0%</td>
<td>+</td>
</tr>
<tr>
<td>Whey</td>
<td>+19%</td>
<td>+3%</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Lactose</td>
<td>+27%</td>
<td>+18%</td>
<td>+14%</td>
<td>+</td>
</tr>
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**Note:** Oceania casein and lactose figures refer to NZ  
**Source:** EU Commission, USDA and 3A estimates
Clearly different production and export trends for key dairy players in 2009

<table>
<thead>
<tr>
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<th></th>
<th>Export trends</th>
<th></th>
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<tbody>
<tr>
<td></td>
<td><strong>EU</strong></td>
<td><strong>US</strong></td>
<td><strong>NZ</strong></td>
<td><strong>World</strong></td>
</tr>
<tr>
<td>SMP</td>
<td>+11%</td>
<td>-10%</td>
<td>+35%</td>
<td>+28%</td>
</tr>
<tr>
<td>WMP</td>
<td>-13%</td>
<td>-9%</td>
<td>+16%</td>
<td>-7%</td>
</tr>
<tr>
<td>Butter/oil</td>
<td>-3%</td>
<td>-6%</td>
<td>+1%</td>
<td>-3%</td>
</tr>
<tr>
<td>Cheese</td>
<td>±0%</td>
<td>+2%</td>
<td>+1%</td>
<td>+4%</td>
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<td>Lactose</td>
<td>-3%</td>
<td>-3%</td>
<td>-</td>
<td>+27%</td>
</tr>
</tbody>
</table>

When world market prices go down, the least cost producer i.e. NZ is taking over the market.

Difference in support systems and product portfolio may partly explain the different trends for EU and US.

US too much a supplier of last resort i.e. last-in and first-out of market cycles (USDEC)

Source: 3A analyses
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Dairy and whey ingredient prices still fairly volatile

The dramatic fluctuations between 2007 and 2009 resulted from supply/demand imbalances and boosted by economic recession.

Price development 2004-10 – dairy and whey ingredients

Note: Based on average US prices

Source: Wisconsin University & 3A Business Consulting
EU/US/Oceania quotations of SMP confirm globalisation of prices and volatility

Source: MS’ communications under reg. 562/2005 & USDA market news – EU Commission
Global Dairy Trade Auction results – short term positive / medium term negative

Prices fixed on 2\textsuperscript{nd} March & 6\textsuperscript{th} April

Source: Global Dairy Trade website
Dairy ingredient markets – future trends

**Short-term**
- Current price levels for commodities appear to be sustainable given supply situation and the demand growth driven by economic recovery

**Medium-term**
- Futures seem to indicate a downside in prices in the latter part of 2010

**Long-term**
- Net important demand will grow faster than net export through 2013 and lead to a latent demand gap as fundamental growth drivers remain intact
  - Population growth
  - Income growth
  - Adoption of western food-orientated culture in emerging markets
- Global imbalances and ongoing market liberalisation will maintain volatile dairy markets

Source: Innovation Center for U.S. Dairy and 3A analyses
Dairy ingredient markets – future long-term trends

- **Asia-Pacific**: No 1 market for dairy ingredients and will remain strongly import dependent

- **Latin America**: Has potential to become a major supplier to the world market (particularly Brazil and Argentina)

- **Oceania**: Production and export set to increase medium term

- **Eastern Europe**: Russia to remain an important import market despite government incentives to increase production. Ukraine has the potential to play a bigger role on world markets

- **US**: Holds the potential for both a bigger production and a more significant role on the world market

- **EU**: Still the world’s largest producer of dairy ingredients, however its relative importance in global markets to decrease – mostly for butter, SMP, WMP and less for cheese and whey
EU-stable milk production and slightly increasing consumption will impact products differently 2010-2013

<table>
<thead>
<tr>
<th>Long-term export trend</th>
<th>Comments</th>
<th>Key future markets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butter/oil</td>
<td>Decreasing</td>
<td>Bulk export is the least profitable use of butter fat</td>
</tr>
<tr>
<td>Cheese</td>
<td>Stagnating</td>
<td>EU cheese types are not easily substituted by other export countries</td>
</tr>
<tr>
<td>SMP</td>
<td>Decreasing</td>
<td>Bulk export is the least profitable use of milk proteins</td>
</tr>
<tr>
<td>WMP</td>
<td>Slightly decreasing</td>
<td>A fair share of EU export is in the form of branded consumer products – better profitability than butter and SMP</td>
</tr>
<tr>
<td>Whey</td>
<td>Increasing for value-added</td>
<td>A fair share of EU export is value-added products e.g. demineralised whey powder for infant formula, and these products are not easily substituted by other export countries</td>
</tr>
<tr>
<td></td>
<td>Decreasing for bulk WP</td>
<td>Trade in bulk whey powder to be dominated by the US and others</td>
</tr>
</tbody>
</table>

Source: 3A Business Consulting
Future key challenges for dairy ingredient companies

**Competence**

Different skill sets required for commodities and high value-added products – not necessarily easy to integrate simultaneously into the same organisation

**Cost concern**

The price premium of dairy in relation to other competing ingredients constrains its use. The price hike in 2007-2008 taught the food processing industry how to replace dairy in many applications

**Solution marketing approach**

- Mass-market sectors such as dairy, ice cream, confectionery, bakery, meat etc. require specific application functionality
- Nutrition and health sectors including infant formula, functional foods, dietary supplements require additional expertise in nutritional and regulatory issues

**Food safety**

Safety assurances and traceability issues increasingly important
Thanks – ta@3abc.dk