Dairy Ingredients in Nutritional Sectors

Supply/Demand Patterns in Food, Supplements and Feed

2005/6 – 2010

USA, Europe

INTRODUCTION

Nutrition and health are the no.1 drivers to innovation in the food and drink sectors. However, the trend is not uniformly spread across the West. While the N. American continent is going through many changes in the supplement sector and witnessing significant growth in the 'nutritional' drinks markets, Europe is moving in a more 'traditional' direction. Whatever be the differences between these two major markets, the overall trend in healthy foods and drinks is more positive now than it has ever been in the past in both regions. This positive environment obviously offers significant opportunities for various ingredients and, in particular, dairy ingredients.

The range, quality and functionality of various dairy ingredients have developed rapidly in recent years. Meanwhile, the structure of the industry is also changing. The mergers and acquisitions of many dairy companies have focussed interest on higher added value activities and the growing international interests of the leaders require an understanding of new customers and their individual requirements.

Giract, well-known for its ingredients and additives business research, analysis and consulting, has joined hands with 3A Business Consulting, the specialist market research company in the dairy industry, to analyse the development of dairy ingredients in nutritional value-added sectors. This study builds on a similar study published by Giract in 1998 covering W. Europe, but is extended to the important US market. As a key player or a company wishing to learn more about these buoyant ingredients, this study serves a dual purpose for you - to help explore and exploit these high-profile markets and to make full use of an in-depth understanding of the market forces to develop your overall business in this sector.

OBJECTIVES

- To quantify the current market demand and to forecast volumes and trends to 2010 for the relevant dairy ingredients and their end product markets
- To understand the choice – the "why" and "why not" – for the use of dairy ingredients and other competitive ingredients based on in-depth interviews with end-users
- To determine the specific functionalities required by the different nutritional sectors
- To establish the supply scenario of the selected 'ingredients'
- To identify opportunities for development into end-use sectors/ingredients

PRODUCTS

Skim milk powder, whole milk powder, MPC, MPI, MPH, whey powders, DMP, WPCs, WPI, WPH, casein/caseinates, lactose, lactoferrin, milk calcium, lactoglobulin, lactalbumin and other (e.g. peptides)

SECTORS

Infant food, sport foods, slimming and therapeutic foods, nutritional bars and meal replacement products, supplements, clinical nutrition, petfood/animal feed

GEOGRAPHICAL

USA, Europe (EU-25/Norway/Switzerland)

TIMESCALE

2005/6 - 2010

PROGRAMME

Following an initial review of extensive in-house data of both companies, the dominant element of the study are interviews with key players - producers, blenders and end-users - in order to derive real understanding of the latest changes in market forces

SUBSCRIPTION

The following flexible subscription options are available:

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3. SUPPLY OF DAIRY INGREDIENTS IN THE GLOBAL CONTEXT

The dairy industry is undergoing a gradual but fundamental change as new technologies create innovative ingredients, expanding the opportunities for the industry beyond its usually very traditional boundaries. Membrane processes and other advanced separation technologies now make it economically feasible to produce a number of new products based on skim milk and whey.

National regulation of milk prices, export subsidies, tariffs and production subsidies for some products continue to present barriers to exploiting these opportunities in some parts of the world – although growing liberalization under WTO means this influence should gradually diminish. Deregulation is already taking place in the EU where subsidies for casein production and for exports of milk powder have been substantially reduced.

These changes may have an effect on the geographical location of production for many of these products. The EU and the USA are likely to concentrate on higher value-added products like MPC/MPI and possibly micellar casein, while the more traditional products like SMP and casein will be produced in regions with lower milk prices and lower processing costs like in Oceania, South America, non-EU Eastern Europe and parts of Asia. Simultaneously increasing amounts of milk will be used for cheese production in the EU and the USA. This will reduce the amount of surplus milk for low cost commodity products but also increase the interest in using MPC in cheese processing in order to increase flexibility, yield and profitability of the cheese production.

As Europe and the USA are the major producing areas of dairy ingredients, it is important to understand their dominant position on the global scene. The following section provides a global overview of the supply of the major dairy ingredients. Four main categories are considered:

- milk proteins
- whey proteins
- lactose
- milk minerals.

European WPC80/WPI producer output volumes 2005/6 **# = text edited out**

ktons	WPC80	WPC35	WPI	WPH
Arla	#			
Bongrain/Armor				
Campina/DMV				
Carbery				
Dairygold				
Friesland Foods				
Glanbia				
Kerry				
Lactalis				
Lactoprot/Rovita				
Meggle				
Milei				
Volac International				
Other				
TOTAL				

Note: x = some production, volume unknown; blank = not producing

4.1.6. WHEY PROTEIN FRACTIONS

The market for whey ingredients has clearly moved from a feed orientation to a food and health care orientation leading to an increasing focus on the more value-added whey products. This has resulted in different developments and new trends within the whey market. The production of whey powder has remained fairly static, as additional whey has been diverted towards high protein processing.

Accordingly, protein fractions such as lactoferrin, lactoperoxidase, alpha-lactalbumin, beta-lactoglobulin and immunoglobulins are relatively new products on the market and gaining in importance from a total value perspective. At present time, the high value-added derivatives, covering WPI, WPH and various fractions as well as lactose derivatives, only account for approx. #% of the total whey products market size equalling approx. USD # million - but from a growth perspective many of these products show rates that are far above those of the whey commodity products.

Information on the processing of whey protein fractions is highly safeguarded by the producers and it is difficult to retrieve specific data compared with other sectors. However, Europe is clearly one region showing most activity in this arena primarily with processors from Australia/New Zealand. Two US processors are also active.

4.2.10. KERRY GROUP – IRELAND

Having developed from being a leading Irish dairy business, Kerry Group has effectively re-invented itself to become a major manufacturer in global food ingredients and flavours markets, and a leading branded consumer foods processing and marketing organization focusing on Ireland and UK. The company consists of 4 main divisions; Ingredients, Flavourings, Foods and Agribusiness. Annual sales are now around EUR 3.75 bio.

On the dairy side Kerry at present supplies milk hydrolysates, milk protein concentrates, casein and various whey products, such as WP, DWP, WPC, WPI, and WPH. In this respect in particular the infant formula industry in Ireland is believed to be one of the main targets for its expansion activities. Ireland over the last two decades has become one of the world's leading producers of infant nutritionals, with Wyeth, Abbott and Numico all present. It is believed that Kerry is currently researching and considering manufacture of alpha-lactalbumin and glycomacropeptides, two ingredients well suited for the more advanced products offered by the infant formula industry.

4.2.11. LACTALIS - FRANCE

As one of France's biggest dairies, Lactalis sells milk, cheese, butter, and cream in about 140 countries worldwide. Trading is done through 9 commercial divisions in France and 14 subsidiary companies abroad. Lactalis' turnover is EUR 6.25 bio. The company processes about 6 bio litres of milk per year.

The business unit Lactalis Industry also includes the division BBA, which specialises in dairy ingredients for application areas such as chocolate products, sweets, dairy products, ice creams, sauces, soups, prepared meals, health food and baby food products. BBA handles approximately 2 bio litres of milk annually.

The Lactalis ingredient product portfolio includes lactose, milk powders, anhydrous milk fat, butter milk powders, concentrated and fractionated butter fats, butter powders, cream, acid/rennet caseins, caseinates, milk calcium and whey products. Lactalis has an estimated processing volume of # tons of liquid whey annually with an estimated production of whey, lactose and derived products of about #tons. Lactose production is estimated at #tons.

Lactalis' strategy is not to engage in specialty dairy ingredients production but to extend its standard products portfolio by providing 'upframed' versions which are enriched in one or more specialty ingredients.

5.4. DAIRY INGREDIENT COMPANIES – PRODUCTION QUANTIFICATION

The summary table below identifies the activities of the individual dairy ingredients companies. Where possible, specific production estimates are provided. Commodity products (SMP, WMP, whey powder, WPC35) are excluded from this analysis.

Main dairy ingredients supply USA – 2005/6 (ktons)

ktons	SMP	WMP	Casein/ates	Lactose	MPC	Whey Powders	DWP	WPC80	WPC35	WPI	WPH
Agrimark											
Alto Dairy											
Davisco											
DFA/Calpro											
First District Association											
Foremost Farms											
Glanbia											
Grande Cheese Ingredients											
Hilmar Cheese											
Kraft											
Land O'Lakes											
Leprino											
Protient											
Saputo											
Sorrento Lactalis											
Swiss Valley Farms											
United dairymen Arizone											
Vitalus											
Westfarm											
Other											
TOTAL											

Note: x = some production, volume unknown; blank = not producing

Health benefits required ***#extract from end user information***

The most important health claims in infant formula are the immunity claims. The key composition factor for infant formula is to make it as as near to maternal milk as possible.

Current use /non-use of dairy ingredients

- **Used**
  - SMP (used in huge quantities "many millions of kilos" - usually purchased locally as liquid skimmed milk. It is used as a protein source)
  - Casein/calcium caseinates (used in lactose free products, as a protein source up to around 13% if used as the only protein source. The interviewee added that they are more used in clinical nutrition than in infant formula)
  - Lactose (mainly as a carbohydrate source. Dosage can be from 10-30%)
  - Whey powder (used in huge quantities for its nutritional value)
  - WPC (likewise - 35%, 50%, 80%)
  - DWP (70%, 90%)
  - Milk calcium (used only recently in a new product, but the company is very unhappy with this ingredient as it is presenting heating and other technical problems)
  - WPH (in some special products, for its nutritional value and for allergy prevention; hydrolysed in-house, not purchased)
  - TMP (in some special products mainly for protein enrichment)
  - WMP (minor)
  - WPI (minor).

In discussing the dairy ingredients which are not used, the respondent indicated that lactoferrin had been tested, whilst there is not interest in the benefits of lactoglobulin enrichment.

- **Under Review**
  - Cysteine peptides (research level)
  - Immune Milk (research level)
  - Colostrum (clinical level - however the interviewee suspects that if trials are really successful, there will be a supply problem for this ingredient, since worldwide there are only small quantities available)
  - Lactalbumin.

Dairy ingredients are readily purchased on a stand-alone basis - unless there is a particular benefit in a combination (eg a product containing heavy component of lactoferrin, but not the expensive "pure" form).

There is a trend towards more microbiologically safe ingredients. Requirements are becoming increasingly severe, but many solutions lie with in-house production processes. Although suppliers arrive with "microbiologically safe" ingredients, further examination can reveal that reality is often not in line with the "microbiologically safe" definition stated by suppliers!

End-market segmentation ***#extract from end user information***

products are sold through health food shops, gyms, chemists, mail order, internet and supermarkets, with exports to 26 countries.

has several sponsorship arrangements and the company's products are endorsed by a number of athletes active within different types of sports such as football, rugby, cricket, swimming and boxing.

Current use /non-use of dairy ingredients

- **Used**
  - WPC (mainly higher than 35)
  - WPI
  - WPH

Annually the firm purchases # tons of whey products.

Future for dairy ingredients in this company

is well informed about the different suppliers such as Arla Foods, DMV International, Glanbia, Armor Protéines etc., and is likely to remain a strong dairy user for the foreseeable future.

7.3.4. DEMAND FORECASTS TO 2010

Current and forecast demand for dairy ingredients in sports foods is estimated:

	Tons 2005	Tons 2010	EUR mio 2005	EUR mio 2010
SMP				
casein/ates				
MPC				
MPI				
whey powders				
WPC80				
WPC35				
WPI				
WPH				
TOTAL				

The forecast reflects the ## of this emerging sector in Europe combined with a gradual penetration of more dairy ingredients in the ##. A gradual substitution of ## by the more protein enriched and more functional dairy fractions such as whey derived concentrates, isolates and hydrolysates is expected to occur.

8.2. INFANT NUTRITION

8.2.1. PRODUCTION AND MARKET CHARACTERISTICS

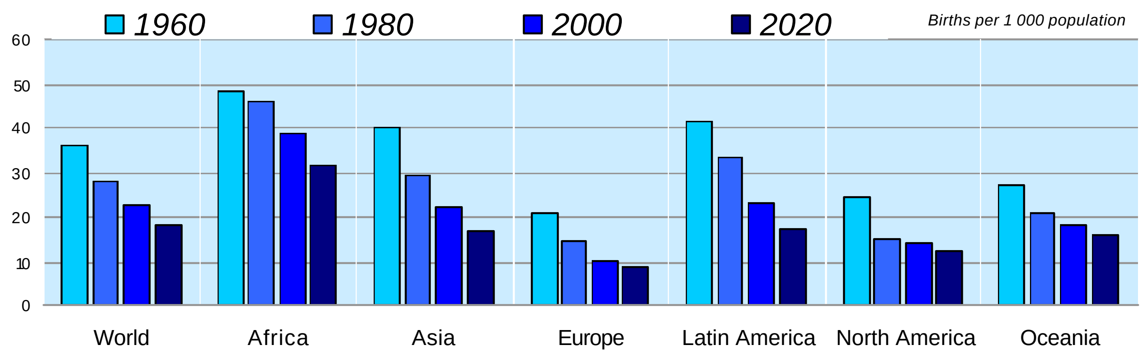
The US infant formula market is estimated at over USD 3-3.5 bio, with dairy formula making up around 75% of the total. Output volume is around # kt, with annual growth estimated at just #%. There are two key players – Mead Johnson and Ross Abbott - followed by Numico, Nestlé and Wyeth, and with a growing minor share taken by PBM Products. Baby foods production is dominated by Gerber, with the remainder taken up by Heinz and Beech-Nut.

Market shares, infant formulae, USA, 2005

Infant formulae	Value share
Mead Johnson (Bristol Myers Squibb)	#%
Abbott (Ross Nutrition)	#%
Numico (Milupa)	#%
Other	#%

Source: FFT

The crude birth rate in the US is in gradual decline, and stood at 14.14 per 1 000 in 2005. The absolute number of births in the reached a record high in 1957, when 4.3 mio babies were born, and now stands at around 4 mio births.



1.3.6. CASEINATES

Caseinates are obtained from casein by treating the latter with a suitable alkali such as sodium hydroxide. The acid precipitated casein is neutralized to pH 6.7 with sodium hydroxide and sodium caseinate is formed. By using potassium, ammonium or calcium hydroxide it is possible to produce potassium, ammonium and calcium caseinates. Caseinates are water soluble.

Depending on the cation (sodium, potassium, calcium, magnesium) there will be variations in the properties.

Functional properties of caseinates

Functionality	Effect
Gelling	Water binding and fat binding, freeze/thaw stabilization
Solubility	Water soluble
Opacity/whitening	Special effect of calcium caseinate
Thickening	Controlled viscosity
Dispersibility	Good dispersibility especially for calcium caseinate
Whipping	Whipping and aeration stability
Emulsification	Excellent emulsification and aeration stability
Nutritional	High value protein and calcium in calcium caseinates

Applications

Caseinate is widely used in the food industry. Sodium and calcium caseinates are the most widely used products, but magnesium caseinate and sodium/calcium caseinates are available on the market. Potassium caseinate is used where a low sodium content is required and magnesium caseinate is used in formulations to achieve a specific mineral balance.

In coffee creamers and milk replacers caseinates are used for addition of soluble protein with emulsification properties. It is also be used as a supplement to casein for production of analogue cheese. In baked products it is used as a milk protein source with reduced lactose content, and in meat products it is used due to the ability to provide body, texture and emulsification properties. In gravy mixes caseinates provide heat stable thickening and dispersibility properties, and in soups they are added to control the rheological properties. In whipped toppings and desserts caseinates are used to improve the whipping properties of the products.