

OUTLOOK FOR DAIRY INGREDIENTS IN THE U.S. FOOD MARKET

MARKET

Technical & Competitive Scanning Regulations

US market – 40 Manufacturers

Update publication: August 07

1 report

350 Pages

MARKET ANALYSE

The Food & Functional Food market:

- ▶ Trends and perspectives
- ▶ Usage of ingredients Volumes - value
- ▶ Manufacturer profiles

INGREDIENTS COVERED

- ▶ Whey/Milk proteins concentrates
- ▶ WPI and whey fractions
- ▶ Whey & Casein hydrolysates
- ▶ Casein & fractions
- ▶ Lactose derivatives
- ▶ Milk bioactive peptides
- ▶ Other dairy nutraceuticals

OBJECTIVES

- This study has for objective to collect the reactions of industrial customers on their need for ingredient and technical service as well as the determining factors in their purchases.
- This report provides the following information:
- Evolutions in the food industry and consequences in the use of dairy ingredients,
- Expectations towards products and services,
- Supplying criteria and suppliers: evolution of buying methods and relation with suppliers.
- This report is divided in two parts:
- The first part includes a presentation of the principal conclusions of the study: customer segmentation, supplier-customer relationships, and key factors of success for dairy ingredient suppliers, etc.
- The second part presents the profiles of food companies and trends by market segment.

MARKET SEGMENTS

- ▶ Dairy products
- ▶ Ice creams
- ▶ Confectionery-Chocolate
- ▶ Toppings -Fillings
- ▶ Dietetic – sportsfood
- ▶ Infant formula
- ▶ Clinical nutrition
- ▶ Bakery - Snacks
- ▶ Meat -porkmeat
- ▶ Ready-to-eat
- ▶ Prepared deserts
- ▶ Sauces – soups
- ▶ Beverages

COUNTRIES COVERED

- ▶ USA

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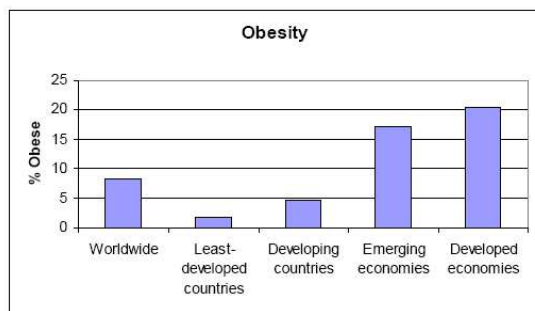
NEW TRENDS IN THE FOOD INDUSTRY

In 2007, the functional food industry has entered the mainstream and is growing rapidly. Today, the major food companies consider functional foods as a key for product differentiation and as an important opportunity to grow. Some major trends characterize this new market, among which:

Obesity has become a major public health issue...

Obesity is rising to epidemic levels, affecting 300 million people around the world. Obesity is also an issue for developing countries. It results from both a sedentary lifestyle and changes in nutritional behaviour.

Obesity is a contributory factor in cardiovascular disease, diabetes, some cancers, joint disorders and other pathologies... But, obesity may also be linked to the decrease of fibers.



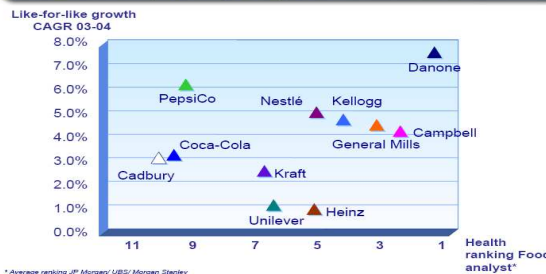
But concern for health extends beyond prevention of obesity

Consumers and health professionals also look for:

- Well-being, i.e. facilitating digestion, optimizing hydration, managing satiety and energy levels ...
- Protection, i.e. preventing deficiencies, supporting immunity, maintaining cardiovascular health, preventing damage from free radicals ...
- Optimal growth, i.e. supporting physical and mental development, building and preserving sound bone and dental capital...

60 million people in the US are on low-carb diets and many food segments have introduced such products (bakery, beverages, ice creams, ...).

Health positioning: a key success factor for sustainable superior top line growth



The response in terms of functional food and ingredient is:

- "Weight management": **Calorie Cut-off** and **healthy fats** has become a main trend: less calories, less sugar or more complex sugars, less saturated fats, less

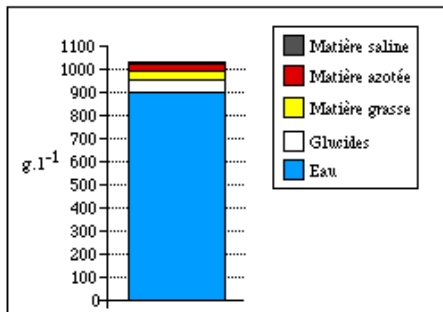
cholesterol, Enrichment with sterols and Pufa's (w3 and w6),

- "Well being", more interest in gastro-intestinal health: development of **pre-probiotics** (soluble fibers, Fos, Gos, microorganisms, volatile fatty acids, but this category is today expanding towards psychological functions such as energy, concentration, relaxation, sleep...
- "Fortified food" more minerals, more vitamins, antioxidants, antiradicals, CLA enhances immune response and cGMP has anti-thrombic effects.
- **Allergens** and **lactose reduction**, less milk, more fermented dairy, "nutritionally correct",
- **Oral care**, particularly for confectionery products. CPP but also cGMP have anti cariogenic effects,
- **New specific products** developed: children, adults, elders, ethnic, "nutrigenomics" - specific food adapted to particular metabolic profiles - tailor made or personalised food.

MILK PROTEINS

Milk is an essential food in our diet because of its balanced composition in nutrients (proteins, lipids, glucids, minerals). It is eaten through various dairy or food preparations (ice-creams, meals, sauces, pastry, sweets...).

Diagramme 1 : Composition chimique globale du lait (en g par litre de lait)



Milk's proteins are divided in two fractions, caseins (that represent 80 % of milk proteins content) and whey proteins.

Whey proteins possess a number of technical characteristics such as solubility, high water retention, foaming and gelation. These criteria make it efficient to use in the formulation of many food products (e.g., bakery, beverages, dairy products, ready-to-eat meals...).

Whey proteins, especially some of their components, are also an excellent protein source for individuals of all ages. They provide a number of health benefits in areas including sports nutrition, weight management, immune support, bone health, and general wellness.

HEALTH BENEFIT OF WHEY

Today, health and food products that enhance health become a question of consumers' interest. The "functional food" market share today varies from 5-6% to 17% in

dairy products and represents a new opportunity for food industry to develop food products with health-enhancing benefits.

There are many factors to explain the fast development of functional food markets:

- Consumers are more and more active on maintaining a good health and are conscious that food is a way to maintain or improve health and wellness;
- The aging population is rising and this one is particularly interested in functional food;
- The health costs are increasing excessively and are placing more emphasis on disease prevention;
- Easy access to nutrition and medical information through media, internet, and advertisement;
- Advances in nutritional sciences, agricultural technologies and processing technics are important and efficient.

There is no legal definition specific for functional food and nutraceuticals. A food can be considered naturally "functional" if it contains a food component that affects one or more targeted functions in a beneficial way (e.g., calcium in dairy foods). While functional foods are generally presented as food, **nutraceuticals** are often considered to be the products produced from foods but sold in other forms (e.g., pills, powders) and demonstrated to have physiological benefits.



include a wide range of products such as sport drinks and bars, baby foods, enriched cereals, breads, prepared meals, flavored milks with bioactive peptides to lower blood pressure, weight loss tablets with glycomacropptides, omega-3-enriched oils...

In that way, dairy ingredients, especially whey proteins, present many functional characteristics that suit nutraceuticals needs (e.g., bioactive roles of specific compounds, efficient technologies for their isolation and incorporation in food products...). For example, recent researchs emphasize the bioactive properties of whey-derived components such as antimicrobial and antiviral properties, immune defense enhancement, anti-oxidative activity, protection against cancer and cardiovascular diseases...

The following examples present the main health-enhanced properties of some dairy fractions.

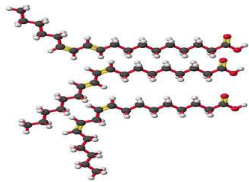
▲ **Glycomacropptide (GMP)** is a k-casein-based peptide that lacks phenylalanine. It is obtained by the action of chymosin and release in whey during cheese manufacturing. It has been shown that GMP can stimulate cholecystokinin (CCK) which is an appetite-suppressing hormone and so, GMP acts as an appetite-regulator. GMP may inhibit platelet aggregation and thrombosis. As a prebiotic, it is a support of beneficial intestinal bacteria growth and it is used as an ingredient in foods for patients suffering from phenyl ketonuria.

Additionally, in an in vitro study, GMP prevented adhesion of cariogenic bacteria on tooth surfaces and so may reduce dental caries.

▲ The **proteoses peptones** represent 3 % of the milk proteins fraction. They are divided into four major components :

- proteose-peptone 3 (PP-3) obtained from the milk fat globules membranes, also known as lactophorin, is an inhibitor of the pancreatic lipase ;
- proteose peptone 5 (PP-5) is a fragment 1-105 of the β -casein ;
- proteose peptone 8 fast (PP-8 fast), which correspond to the fragment 1-28 of the β -casein, is a phosphopeptide that may enhance the gastrointestinal absorption of calcium;
- proteose peptone 8 slow (fragment 29-105 of the β -casein) contains peptides with opioids activity.

▲ **Conjugated Linoleic Acid (CLA)** is a collective term to design positional and geometric isomers of linoleic acid, an essential fatty acid, obtained from whey lipids.



Conjugated isomers of linoleic acid. The two upper structures refer to c 9, t 11-CLA and t 10, c 12-CLA. The lower is c 9 c 12 linoleic acid.

CLA may lowers total and LDL cholesterol as well as triglycerids levels and enhances immune responses. They are used in test in trans fat oils.

▲ **Prebiotics** modulate the composition of the natural ecosystem by stimulating growth of indigenous micro-organisms, whereas probiotics refer to exogenous live bacteria that beneficially affect the host by improving its instestinal microbial balance. The trend is to develop synbiotic products that contain both a probiotic and a prebiotic.

Galacto-oligosaccharides have such an activity. They increase the level of gut *Bifidobacteria* and are known to stimulate immune defense, to product vitamins, and to inhibit the development of pathogen organisms such as *Escherichia coli*, *Clostridia*... They also have anti-colon cancer properties and can improve calcium bio availability. They are mainly used in infant formula today, but their use is expanding to dairy products, ice-creams and beverages.

MARKET APPLICATIONS OF WHEY PROTEINS

Whey proteins can perform a number of technical functions in food products. They possess solubility over a wide pH range, even near their isoelectric point, create viscosity through water-binding, form gels, emulsify, bind fat, facilitate whipping, foaming and aeration, enhance color, flavor and texture, and bring with them numerous nutritional advantages. In their native state, they are highly soluble and adeptly perform emulsification and whipping functions in a food application.

For example, **high solubility over a wide range of pH** makes WPCs a good candidate for **sport beverages**.

Some technical functions of whey when incorporated in food products are for example:

▲ In **baked goods**, whey proteins are used to enhance crust browning, bread flavor and crumb structure. They can delay staling.

▲ Their use is especially interesting in acid food products like **beverages**. They provide a high solubility in a large range of pH, a high dispersibility and good suspension stability. They impart a smooth mouthfeel with a bland flavor.

They can emulsify fat-containing beverages, aerate shake-type drinks and impart a low viscosity useful in dietary product or



convalescent food. Finally, they provide an economical source of high-nutritional-quality proteins.

▲ Whey proteins can usefully replace or supplement meat proteins, soy proteins, modified starches and hydrocolloids gums in **processed meats**. They have no flavor on their own and are compatible with cooked meat flavors and spice/seasoning blends. Their water-binding capacity improves cook yield with a positive economic

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impact. They give firmness texture and facilitate retention of moisture during process and cooking.

▲ Whey proteins are specifically used in **sport nutrition** (drinks and bars) because of their high nutritive value. They have an excellent metabolic efficiency and are easily digest. Whey proteins have the highest concentration of branched chain amino-acids (BCAAs) which provide energy

Whey proteins contain glutamine that helps muscle glycogen replenishment and prevent decline in immune function from overtraining, and high levels of arginine and lysine that may stimulate growth hormone release and an increase in muscle mass. They are a good source of calcium that reduces stress fractures.

PRODUCT CATEGORY	PRODUCTS	PROPERTIES WANTED	High Gel WPC	Heat Stable WPC/WPI	Other Proteins Used
Drinks	Acidic drinks Fruit flavored drinks Smoothies Diet drinks	heat stable at an acidic pH and at high temperature provides clear drinks		■	
Low-fat butter		emulsion water retention binding / stabilization smoothness			Caseinates + WPC blend Caseinates
Diet products	meal-replacement		■		
Desserts	Mousse-type desserts Meringues	overrun	■		Caseinates Partially hydrolyzed WPC
Dairy	Fermented milks				
Low-fat desserts	Low-fat ice-cream Low-fat yogurts	palatability enhancement	■		Total milk proteins
set curd yogurt		gel firmness			WPC, WPI
stirred yogurt		increased viscosity			Total milk proteins
Meat	Reduced fat meat Low-fat pork sausage Frankfurters		■		
Sauces	Sauces/dressings		■		

EXAMPLE

COMPANY	X
ACTIVITY	Dairy products
COUNTRY	USA

Ingredients used

DAIRY INGREDIENTS	
Milk powders	500 tons
Acid casein	
Whey powders	
WPC	1,000tons
Lactose	
OTHERS TEXTURIZING AGENTS	
Xanthan	
Carrageenans	

Product usage

Tendency is to buy commodities, with value added.

The requirement for dairy ingredients is primarily driven by functional reasons and the quality image.

Milk proteins are good emulsifiers, and are especially useful for stabilizer-free formulae. The Company is looking for more soluble proteins at ph close to the iso-electric point of wpc or whey proteins in general. Many products are given at a neutral ph while we are facing different ph conditions.

Lactoproteins are used as a milk substitute, and have good foaming properties. Casein is a good texturing agent but it's unstable and precipitate easily. Due to the high cost of casein, they are switching to other dairy ingredients. Solubility and dispersibility of proteins are the two most important

criteria to optimise: the consumer must not see the adjunction of ingredients (at the level of appearance and taste). The importance of solubility intervenes particularly in the context of production process; dispersibility is important for the taste of the product.

The Company uses two ingredients to valorise their "functional food" role. The company produces milk enriched in sterols and works in its laboratory at the creation of new products (fermented milks, yogurts) biologically functionals. There is a strong will to develop nutraceutical foods.

They have two types of drinkable products, containing two types of protein hydrolysates:

- High DH (30-40). The absorption is much faster. Even though the taste is quite bad, there is a current fashion for this kind of product among very strict sportsmen as they think they are more efficient.
- low DH 10-20. These are much more palatable as the peptide chains are longer.

There are no major shortcomings in the supply of dairy ingredients. Main ingredient suppliers have good R&D programs and are quick to bring new or innovative products to the attention of users.

Expectations towards service

Food industry is searching for good technical support services and research and development facilities. A supplier must be a specialist of its products and know well customer's processes. It should provide a constant flow of information on new products and applications.

Supply

MAIN SUPPLIERS	
DAIRY INGREDIENTS	Land O'lakes, Kerry Ing, DMV, Fonterra, IDB, Glanbia,
OTHERS TEXTURIZING AGENTS	Danisco

General purchasing policy

Each group company is responsible for its own purchasing. Therefore, two or more group companies may be dealing with the same supplier. There is a general trend to limit number of suppliers but only so far. They seek type of partnership with suppliers.

For supplier selection, the most important department is the purchasing department following by the R&D department.

Most of the larger suppliers have been listed for many years. But frequent changes in personnel or lack of product knowledge or awareness on the part of salesmen can often put this in jeopardy.

Buying criteria

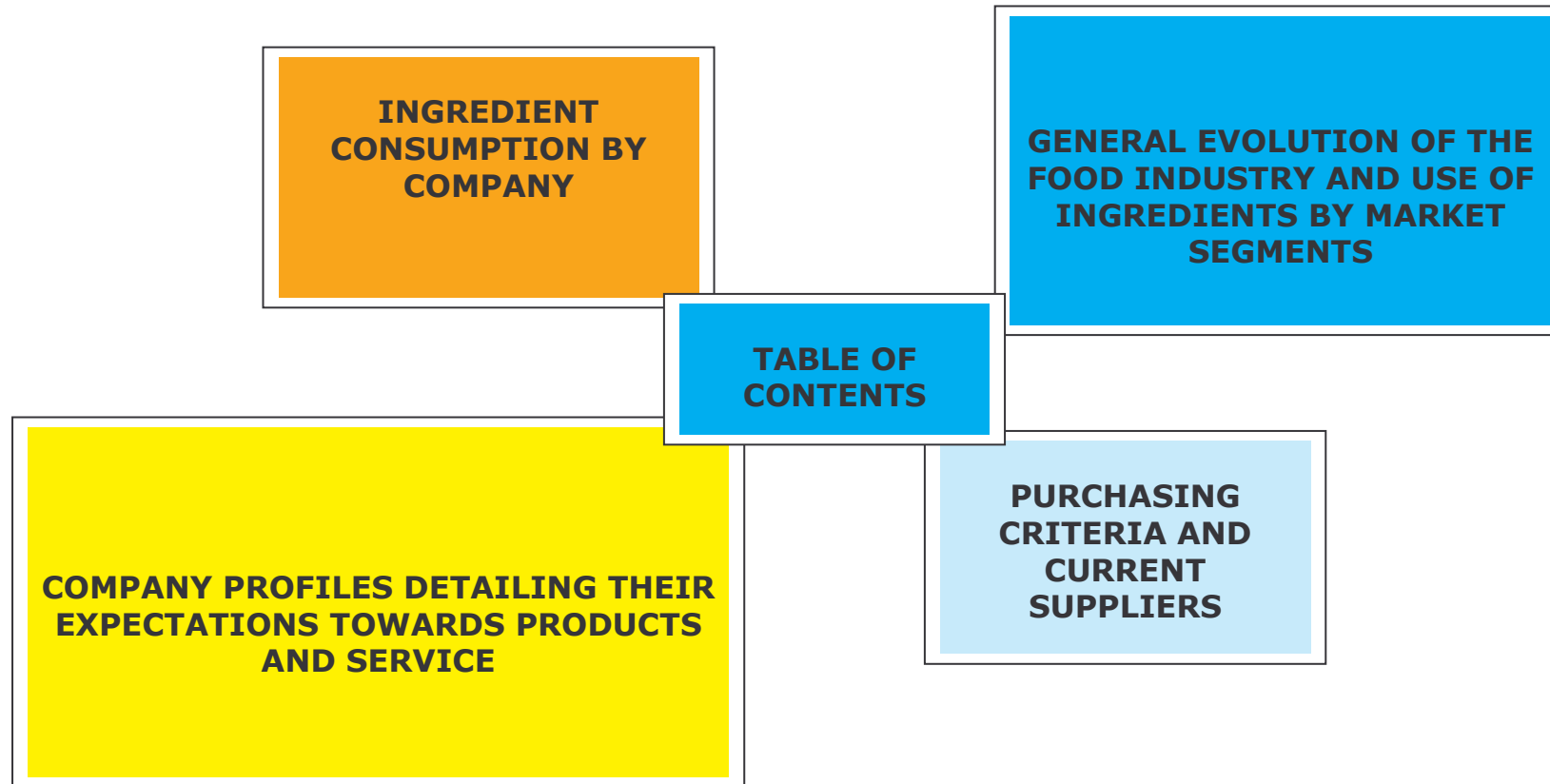
The main criteria required to choose a supplier are the following ones :

- ☛ a competitive price
- ☛ quality of products
- ☛ traceability of products
- ☛ products constance

Change of major suppliers is becoming rare as both company and supplier will have heavily invested in supplier quality assurance (procedures / documentation / testing methods, etc...) in a real partnership.

All supplying companies are now very professional. Relationship between company and its suppliers creates a pool of knowledge, which benefits both the company and its suppliers.

PRESENTATION



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