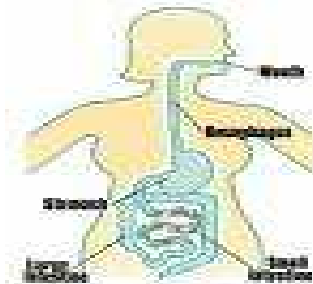


This comprehensive report is based on in-depth interviews with food and food supplements companies completed by a desk review.

It provides for DECISION MAKERS a global understanding of the sector as well as an outlook on its future.



MARKET ANALYSIS

- Trends and outlook
- Use of ingredients: volume-value
- Manufacturers profiles
- Users opinions
- Regulation

INGREDIENTS

- Probiotics
- Synbiotics

FOOD SEGMENTS

- Food industry
- Functional food
- Food supplements

COUNTRIES COVERED

- North America
- Western Europe
- Asia
- Australia- New Zealand



UBIC USA

5020 Campus Drives
NEWPORT BEACH
CA-92660
Phone: 1 949 296 7544
Fax: 1 949 752 2287

UBIC EUROPE

Techno-Pôle 3
CH 3960 SIERRE
Phone: +41 (0) 27 456 1440
+41 (0) 27 456 1444
Fax: +41 (0) 27 456 1447

UBIC IRELAND

45 Glencarraig
DUBLIN 13
Phone: 353 1 832 47 12
Fax: 353 1 832 12 77

UBIC FRANCE

10, Rue du Colisée
75008 Paris
Phone: +33 1 400 600 86
Fax: +33 1 400 600 87
Skype Access : UbicEurope

OBJECTIVES

MARKET

Consumer trends
Use of ingredients
Outlook

MANUFACTURERS

Food industry usages and needs
Applications in food segments

RESEARCH

New probiotics
Scientific and technical aspects

ENVIRONMENT

Regulatory aspects

INTRODUCTION

A **probiotic** is a live microbial feed supplement which beneficially affects the host animal by improving its intestinal microbial balance.

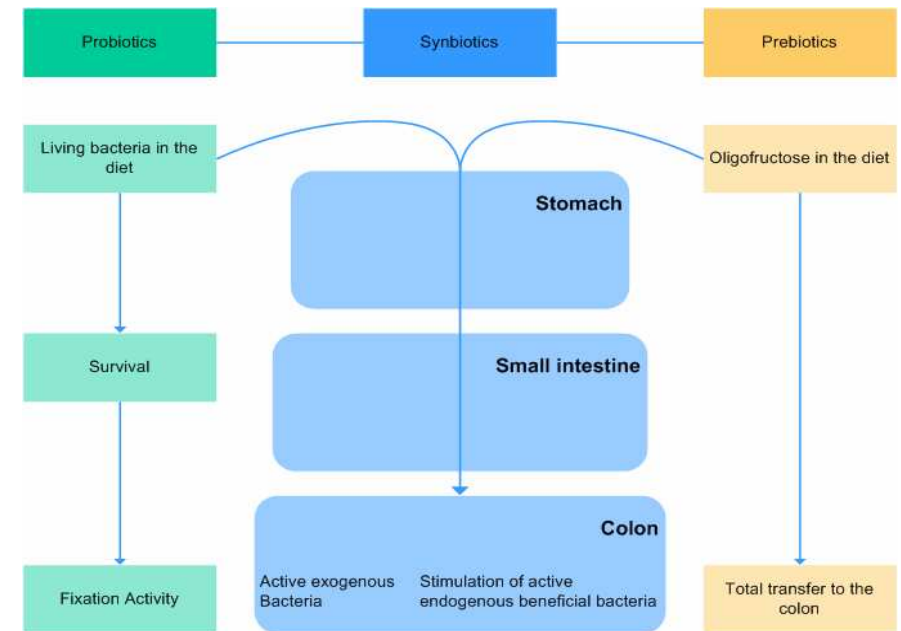
A **prebiotic** is a non digestible food ingredient that beneficially affects host health by selectively stimulating the growth and/or activity of one or a limited number of bacteria in the colon

A **synbiotic** is a mixture of pro- and prebiotics which beneficially affects the host by improving the survival and implementation of live microbial dietary supplements in the gastrointestinal tract by selectively stimulating the growth and/or by activating the metabolism of health promoting bacteria and thus improving host welfare.

The FAO/WHO definition is "probiotics are live microorganisms which when administered in adequate amounts confer a health benefit on the host". This definition has the following characteristics:

- Probiotics must be alive. Although it is recognized that dead cells may mediate physiological benefits,
- Probiotics must deliver a measured physiological benefit, substantiated by studies conducted in the target host
- Probiotics needn't be restricted to food applications or oral delivery. Probiotics used as pharmaceuticals or as topical agents are not excluded from this definition

- A definition of probiotics shouldn't limit the mechanism of action. Therefore, survival of gastrointestinal tract transit or impact on normal flora shouldn't be required. For example, the delivery of lactase by, for example, *Streptococcus thermophilus*, to the small intestine was recognized as a probiotic activity.



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The following table contains a partial list of probiotics that have been used or are currently used for human and animal consumption. The list, although appearing relatively long, is actually only a small fraction of all of the microorganisms known that are believed to be non-pathogenic.

• Bacteria having claims to be probiotics
L. acidophilus
Bifidus
Bifidobacteria
B. adolescentis
B. longum
B. bifidum
B. bifidus
B. breve
B. subtilis
B. infantis
B. lactis
B. laterosporus
Causido
Enterococcus faecium
Escherichia coli
Leuconostoc mesenteroides
L. helveticus
L. plantarum
L. rhamnosus
L. rhamnosus GG
L. casei
L. casei immunitass
L. casei rhamnosus
L. casei shirota
L. johnsonii
L. sporogenes
L. salivarius

Source: British Journal of Nutrition (1998), 80, Suppl.2, S203-S207

OUTLOOK OF THE MARKET

Probiotics are a growing segment of the nutraceutical industry, employing bacteria cultures as a food additive. These bacteria are claimed to improve body resistance to intestinal infections (although there is still some discussion on whether this claim has or has not been sufficiently proven).

If we take a strict definition, only a few strains can be considered as probiotics. In fact, clinical studies should be randomized, in double blind, duplicable, and with specific health benefit. The near future may see the apparition of a more controlled definition for the "probiotic" appellation.

The world probiotic market was estimated to 10% of the lactic bacteria drink market. The market evaluation also depends a lot on the definition used for probiotics. Today, this market is growing at a pace of 5 to 30% depending on the country and product type.

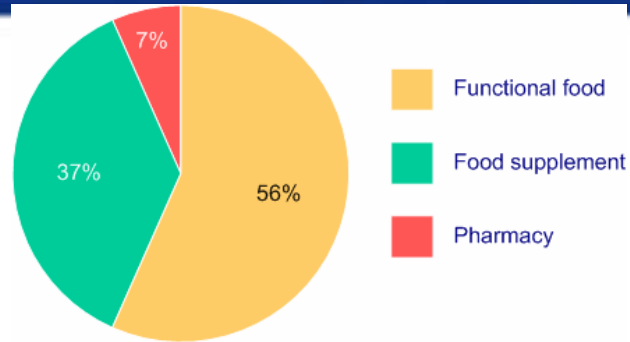
In general, 60% of the value is presented by direct set cultures, whereas 40% is represented by inoculated bacteria.

Main countries using probiotics – Market evaluation in US\$ mio.

Regular yogurt Lactobacillus bulgaricus and Streptococcus thermophilus	Probiotic yogurt Bifidobacterium Acidophilus	Probiotic drinks	Kefirs
11,348	4,127	1,662	350

Source: Diverse sources based on studies and statistics
Countries include: USA, W.Europe, Japan, China, Thailand, Mexico, Argentina





Source: suppliers

REGULATION

There is no specific EU legislation on probiotic bacteria and their use in food. Each Member States may have adopted specific rules regarding these ingredients.

Several of the bacteria used in the USA as probiotics are listed by the FDA on its "Partial List of Microorganisms and Microbial derived ingredients that are used in Foods".

The usual approach for safety assessment for marketing probiotic bacteria in the USA is presumption of safety, reasoned by a long history of safety in fermented dairy products.

In Japan the FOSHU food category includes such nutraceutical ingredients as oligosaccharides, and lactic acid bacteria.

HEALTH ASPECTS

There is a long list of health and developmental benefits that have been attributed to probiotics: a main property is the improvement of intestinal microbial balance of the host and immune system enhancement. Bifidobacteria, for instance, play a significant role in controlling pH of the large intestine through the liberation of lactic and acetic acid, which in turn restricts the growth of many potential pathogens.

Other aspects concern: cholesterol reduction and anti-hypertensive function, inhibition of the growth of carcinogenic tumors, treatment of allergies or tooth decay, women's and men's health, etc

As mentioned earlier, the scientific background supporting those claims is still controversial. Some studies having showed that the results were depending on each individual.

TECHNICAL FACTORS

Only a few companies have the capacity to develop probiotics: It implies the ability to reach the proper concentration, standardization of the concentration, get a correct stability and adequate bacteriological quality.

It is more difficult to produce probiotics than regular lactic bacteria. The strains are more sensible to their environment, and there is a bigger loss during the process.

A number of producers can only do it on an empiric basis and cannot reproduce it on a standardized regular basis.

INNOVATION

Japan is by far the most innovative country in terms of new applications. Japanese companies adapt themselves to the growing share of a health conscious population. New products resulting from totally new concepts have been launched on the Japanese market in 2003. For example, yogurts that fight tooth decay or beverage, such as Kirin Noale, using KW lactic acid bacteria against allergy. Morinaga sells yogurts with BB356 and lactoferrin. Calpis in Ameal yogurt drink mixes lactic acid bacteria and lactotripeptides to reduce blood pressure. With Interbalance L-92, using lactobacillus acidophilus developed by the company, Calpis also fight seasonal allergies but additionally claims to relieve fever.

A key factor responsible of the development of the Japanese market, besides its long-lasting experience of fermentation products, is a comparatively easier access to Foshu appellation than in Europe or the U.S. where the authorities have been highly cautious so far with

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