

TREND DEEP DIVE

FUNCTIONAL FOODS – METABOLIC HEALTH

2H 2019

FutureBridge

01

EXECUTIVE LENS

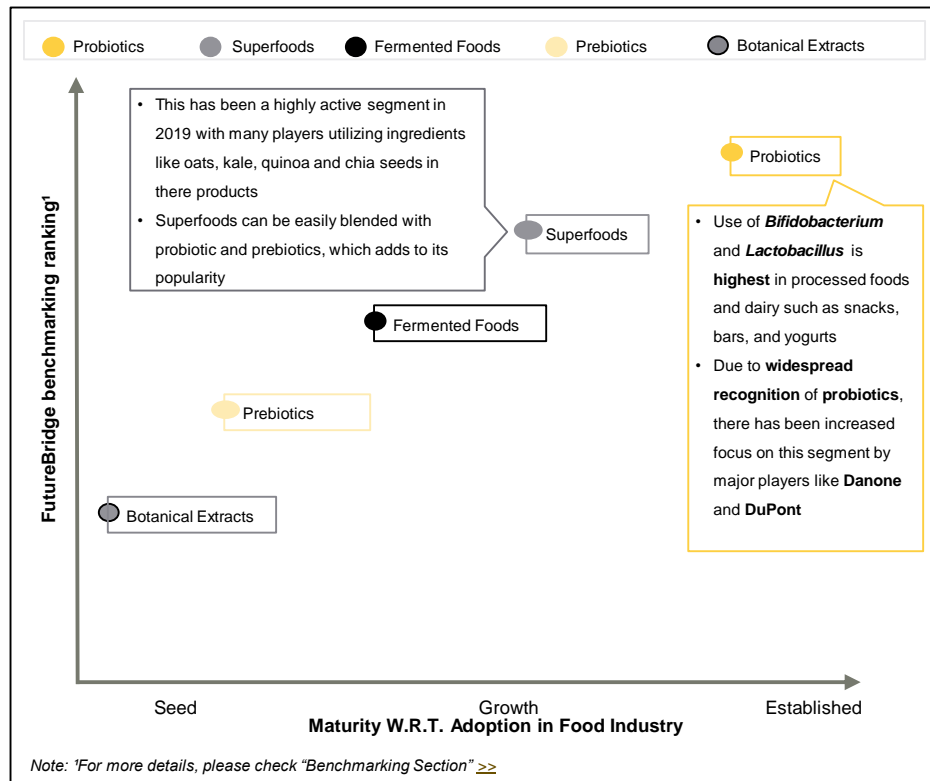
Summarized insights for Functional Foods for Metabolic Health w.r.t. trends in technology, market, and players



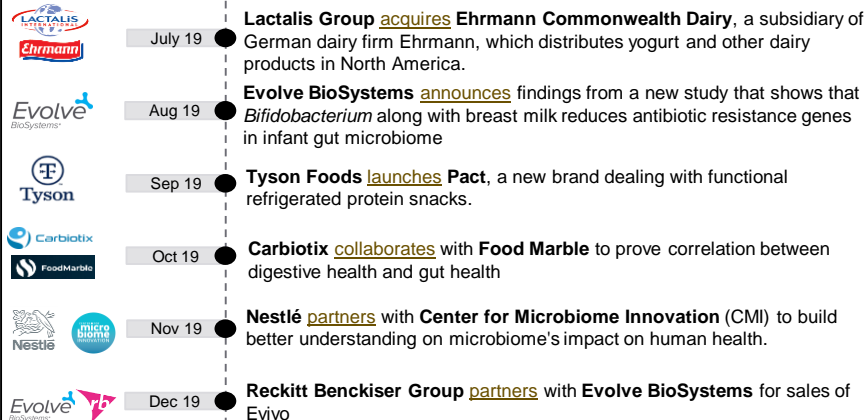
State of the Trend

High focus on superfood products due to customer preference for naturally sourced berries, vegetables that provides off beat and refreshing flavors along with health benefits

Which tech/solution categories are on the move? What are the key developments in Metabolic Health?



Key developments in past 6 months



Things to watch in next 6-18 months

- Development of **technological solutions** to increase the stability and shelf-life of probiotics
- We expect to see more number of **commercialized product utilizing synbiotics** in its formulation to provide health benefits
- Players **collaborating with research institutes** for researching on **gut microbiome** in order to commercialize **microbiome testing technologies**
- Development of **specific fermented cultures** for utilization in **plant-based drinks** and **yogurts**
- Players developing products to **target beyond metabolic health** such as **stress, anxiety, and depression**

Market Dynamics

Consumer preference for healthy foods is the driving factor in the domain, whereas high costs and regulations act as a challenge for manufacturers

What are the current key drivers and challenges & limitations?

Key Drivers

RISK OF CHRONIC DISEASES

Scientists have identified **bioactive** food components like **polyphenols**, **antioxidant**, **curcumin**, etc. in functional foods that can help in **prevention and control** of chronic diseases like **diabetes**, **cardiac diseases**

SELF DIRECTED HEALTHCARE

Large section of the population are taking preventive steps like **inclusion of healthier alternatives in diets which act as preventive healthcare** and can tackle the health issues

IN-TREND PRODUCT CLAIMS

Health claims and 'tags' on products are promoting consumers to opt for functional foods and they add to the product hype

ACCESSIBLE CONVENIENCE

Instead of remembering the nuances of a pill regimen, consumers are looking for **instant fix products** like on the go beverages that contain functional ingredients and have health benefits

TECHNOLOGICAL FOCUS ON TRADITIONAL INGREDIENTS

Increasing focus on botanical and naturally derived traditional substances and their potential to improve human health has led to the discovery of health benefits of many commonly used ingredients

Challenges

NATURAL INGREDIENTS

Consumers are increasingly demanding functional foods that are being developed using **natural ingredients**. There is high demand for clean products that **promotes transparency**. This is posing as a challenge as players are trying to find natural substitutes

CONVENIENT SNACKING

As the **manufacturers** have to recover the costs of **advanced technology** used in functional foods, the **product cost is higher** as compared to the conventional foods

CONVINIENT SNACKING

Consumers are looking for products that are **on-the-go or ready-to-eat** healthy foods which requires advanced technologies

SHELF LIFE

Shelf life stability of functional food products in segments like dairy, bakery act as a major concern and it affects the quality and viability of products

REGULATORY ASPECTS

There are **strict regulations** regarding food products, many trials are done to check their safety and efficacy. Hence, companies are more **inclined** to develop **supplement** products

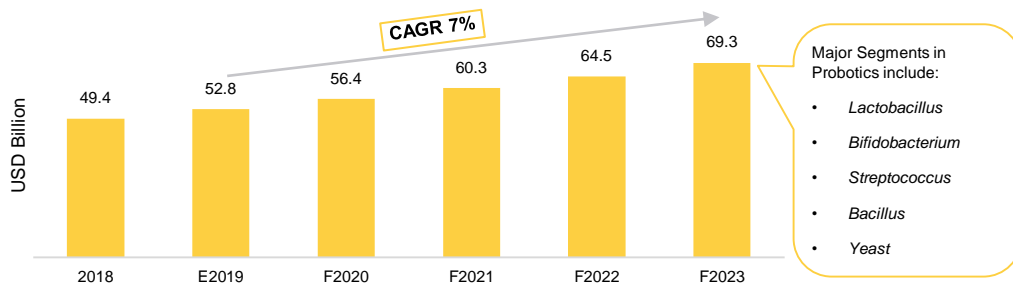
Key: Yellow color indicated parameter of greatest impact

Market analysis of probiotics

Probiotics market significantly is growing with the CAGR 7% and Europe has the largest market share in probiotic domain

What is the current market focus for probiotics?

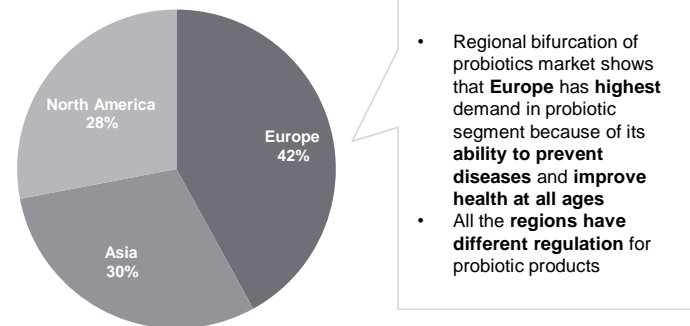
Global probiotics market forecast for 2018-2023



*E: Estimated; *F: Forecasted

*Source: Newsletter, [Kerry insights](#), [Ganeden](#), [Journal of Probiotics & Health](#), [statista](#)

Regional Probiotic market (2018)



*Source: [International Journal of Chemical Studies](#)

- The need for **food-based drug substitutes** and combat related lifestyle diseases is **propelling the market of functional foods such as probiotics and prebiotics**
- The market of probiotics is **expected to reach \$69.3 billion at CAGR 7%** by 2023 due as manufacturers are trying to provide convey a **digestive health benefit** while **offering flexible formulation** attributes for the food and beverage development
- Other drivers affecting the market include **increasing awareness** amongst health-conscious population, **increasing aging population** with weakened digestive capabilities and **awareness of functional benefits beyond digestive health**, which includes immunity and cognitive health
- Other segment are prebiotics are growing slowly its market is **expected to reach \$5.8 billion at CAGR 11%** by 2023 and the major influencing factors include the **level of acceptance of different dietary products, price volatility of raw materials, product innovation by producers, and degree of acceptance of natural prebiotics** in developing countries

Regional Trend

Probiotics are the most utilized in functional foods domain but there is disparity in regulations of probiotic products all across the globe

North America

United States

- **Regulatory bodies:** DSHEA (Dietary Supplement Health and Education Act), and FDA (Food and Drug Administration)
- **Probiotics:** If used in the form of dietary supplement, then are considered as foods. If there is a new dietary ingredient then the manufacturer is required to notify FDA. Medical food are those products intended for external use in the dietary management of a disease or condition for which distinctive nutritional requirements
- **Functional foods:** no clear definition for functional foods

LATIN AMERICA

Brazil

- **Regulatory bodies:** ANVISA (The National Health Surveillance Agency)
- **Probiotics:** considered as functional foods
- **Functional foods:** items to which health ingredients are added due to which they have specific physiological function and health benefits beyond their nutritional value

Europe

- **Regulatory bodies:** FUFOS (regulatory commission on functional food science in Europe), QPS (Qualified presumption of safety)
- **Probiotics:** Probiotic cultures, when incorporated in food, are most often classified as food supplements or dietetics, but also in some cases as pharmaceuticals
- **Functional foods:** food that beneficially affects one or more functions in the body beyond adequate nutritional effects, reduces of risk of disease. It is consumed as part of a normal food and is not a pill, a capsule or any form of dietary supplement

Asia-Pacific

China

- **Regulatory bodies:** SFDA (State Food and Drug Administration)
- **Probiotics:** a micro-ecological preparation that can promote the ecological balance of intestinal flora and has a beneficial effect on the human body
- **Functional foods:** is defined as a food that has special health functions or is able to supply vitamins or minerals and has the capability to regulate human body functions

India

- **Regulatory bodies:** FSSAI (Food Safety and Standards Authority of India), PFA (Prevention of Food Adulteration), FDA (Food and Drug Administration)
- **Probiotics:** are regulated differently as per their intended use, are characterized as functional food rather than as pharmaceutical drugs and are regulated by food laws that regulate general food items
- **Functional foods:** Food that has physiological functions, including regulation of biorhythms, the nervous system, the immune system etc.

Japan

- **Regulatory bodies:** FAO (The Food and Agriculture Organization), WHO (World Health Organisation), MHLW (Ministry of Health, Labor and Welfare), FOSHU (Food for Specified Health Uses)
- **Probiotics:** The live micro-organisms which when administered in adequate amounts confer a health benefit on the host
- **Functional foods:** parts of a food or wholefood that have any medical or health benefit, including the prevention and treatment of disease and these have separate approval process

Australia and New Zealand

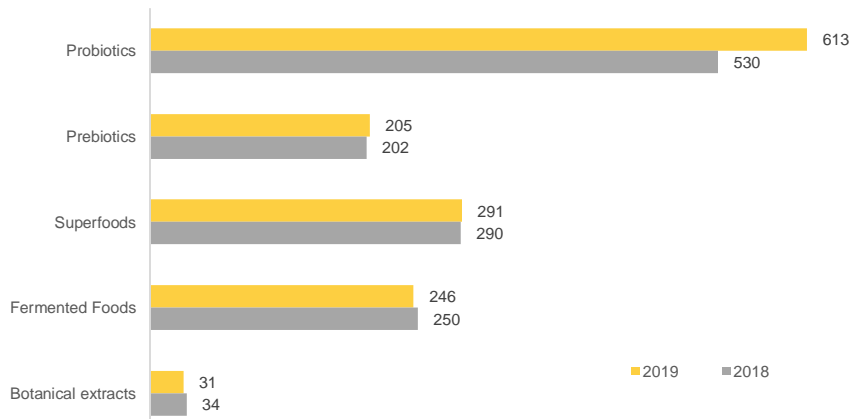
- **Regulatory bodies:** FSANZ (Food Standards Australia New Zealand)
- **Probiotics:** The live micro-organisms which when administered in adequate amounts confer a health benefit on the host
- **Functional foods:** intended to be consumed as part of a normal diet, are supposed to serve physiological roles beyond the provision of simple nutrient requirements

Source: [Indian Journal of Medical Microbiology](#)

Research analysis

There is high research activity observed in field of probiotics is high as players are trying find innovative strains and methodology, superfoods is also upcoming and is being utilised in snacks and beverages

Research activity in each technology (2018 Vs 2019)



Note: 'For more details, please check "Technology Section" >>

- The **highest activity** was observed in the field of **probiotics**, followed by **superfoods**
- Researches are trying to formulate **heat stable probiotics** that are **viable for a longer duration** and can be **incorporated into variety of food products**
- In all the technologies the research activity is **higher in comparison to 2018** which signifies that there is an increasing focus on forming **innovative ingredients** and technologies that can help to **shape with the future of functional foods**

Source: Web of Science

INSIDERS TOP 5 RESEARCH PICKS

Ashwagandha: Functional Botanical Extract

Title: [Adaptogenic and Anxiolytic Effects of Ashwagandha Root Extract in Healthy Adults: A Double-blind, Randomized, Placebo-controlled Clinical Study](#)

Authors

Jaysing Salve, Sucheta Pate *e.t. al.*

Kombucha: Novel fermented beverage

Title: [Use of kombucha consortium to transform soy whey into a novel functional beverage](#)

Authors

Chuanhai Tu, Sijie Tang, and Fidelis Azi *e.t. al.*

Superfood vegetables to boost metabolism

Title: [Kale \(Brassica oleracea var. acephala\) as a superfood: Review of the scientific evidence behind the statement](#)

Authors

Šamec D, Urlić B, and Salopek-Sondi B *e.t. al.*

Prebiotics for fighting obesity

Title: [Gut commensal Parabacteroides goldsteinii plays a predominant role in the anti-obesity effects of polysaccharides isolated from Hirsutella sinensis](#)

Authors

Wu TR, Lin CS, Chang CJ *e.t. al.*

Methods to improve stability of probiotics

Title: [Preparation of Bifidobacterium breve encapsulated in low methoxyl pectin beads and its effects on yogurt quality](#)

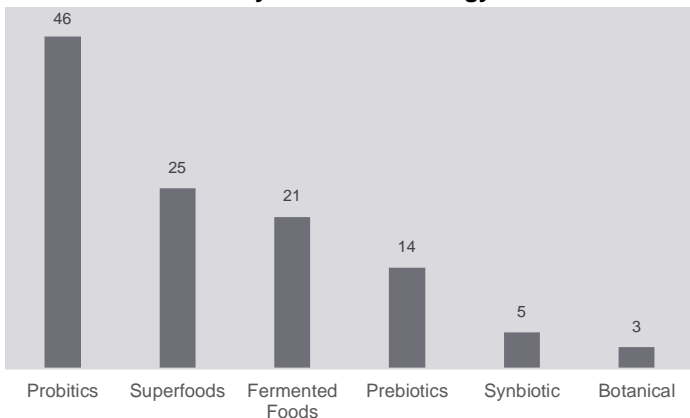
Authors

Mengyang Li, Yunxiang Jin, Yawei Wang *e.t. al.*

Patent Analysis

Patents are smart investment and it increases company's long term viability, boosts a company commercial prospects and increases its brand value

Patent activity in each technology 2H 2019



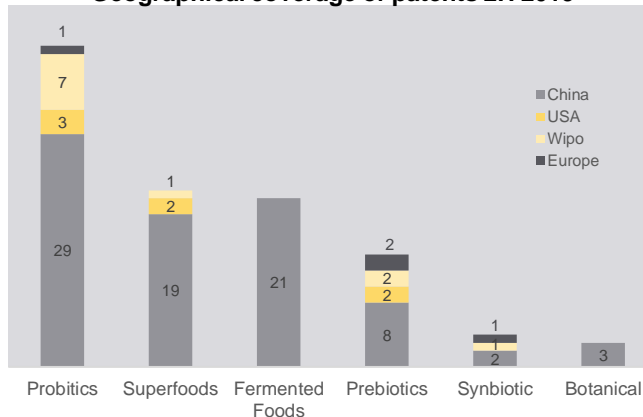
Note: *For more details, please check "Technology Section" >>*

Probiotics emerges out as top field in IP

- Highest number of patents were filed in the probiotic field in the past six months. These patents are dealing in preparation of beverages, ice-creams and capsules utilizing novel probiotic strains
- Patent activity is mainly centered to form cost-effective, stable products that can be utilized to boost metabolism and digestion
- Synbiotics is a growing area and players are patenting formulations to boost intestinal flora and to alleviate inflammatory disorders

Source: Orbit

Geographical coverage of patents 2H 2019



China surfaces as topmost region in patents

- Most of the patents are filed in China, which signifies that player will commercialize technologies in this region in upcoming years
- China is acting as a hotspot for functional products as China's SAMR (State Administration for Market Regulation) has redefined regulations related to products containing probiotics. The new rules would expand probiotics products from just dairy industry and find their way into more health foods and supplements

Top Assignees 2H-2019

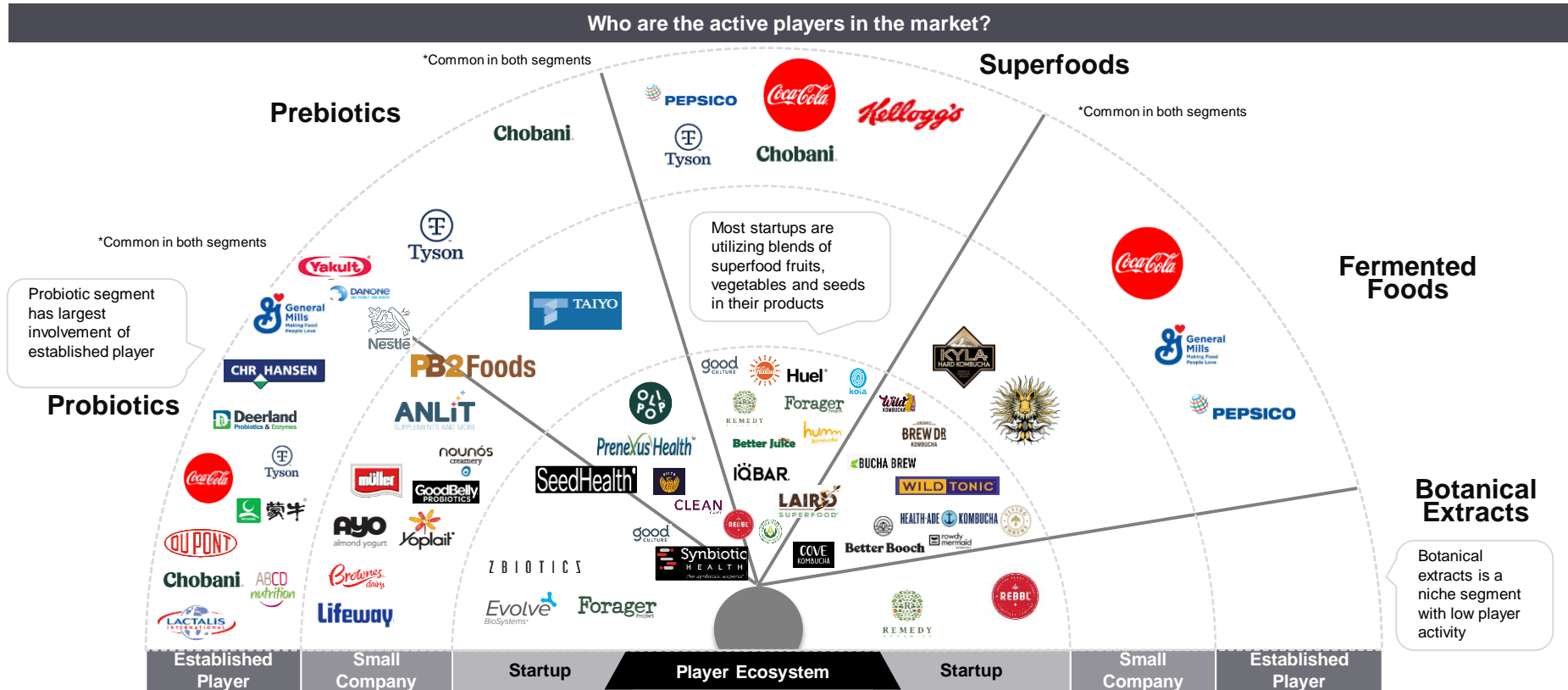


Established players target probiotics

- Established players like Chr Hansen and Danone Nutricia are filing patents in field of probiotics. Chr. Hansen filed a patent to utilize *Bacillus subtilis* in animal feed products
- ABCD Nutrition also filed a patent on Probiotic composition of particular use in order to decrease the symptoms and inflammatory digestive symptoms

Player Ecosystem

Majority of key players like Chobani, Chr Hansen and Danone are focused on development of probiotics and superfoods to target metabolic health domain



Player Strategies

Collaborative and acquisition strategies are utilized by companies to gain access to new technologies. Product launches have been highest to gain largest market share in the functional foods domain

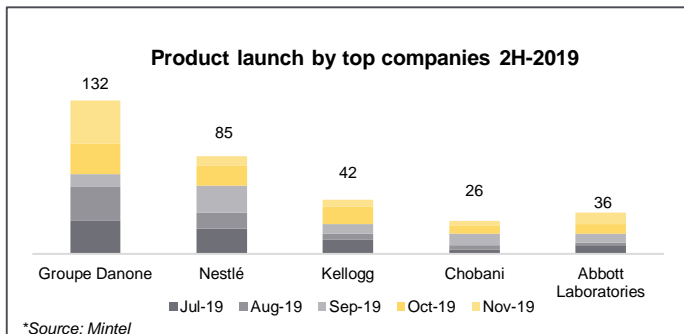
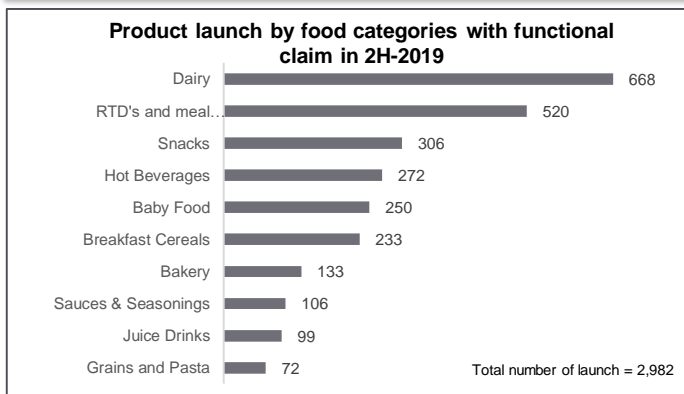
COMPANY STRATEGIES			
Collaborations	Product Launches	Expansion	Acquisitions

Source: Company websites, Newsletters

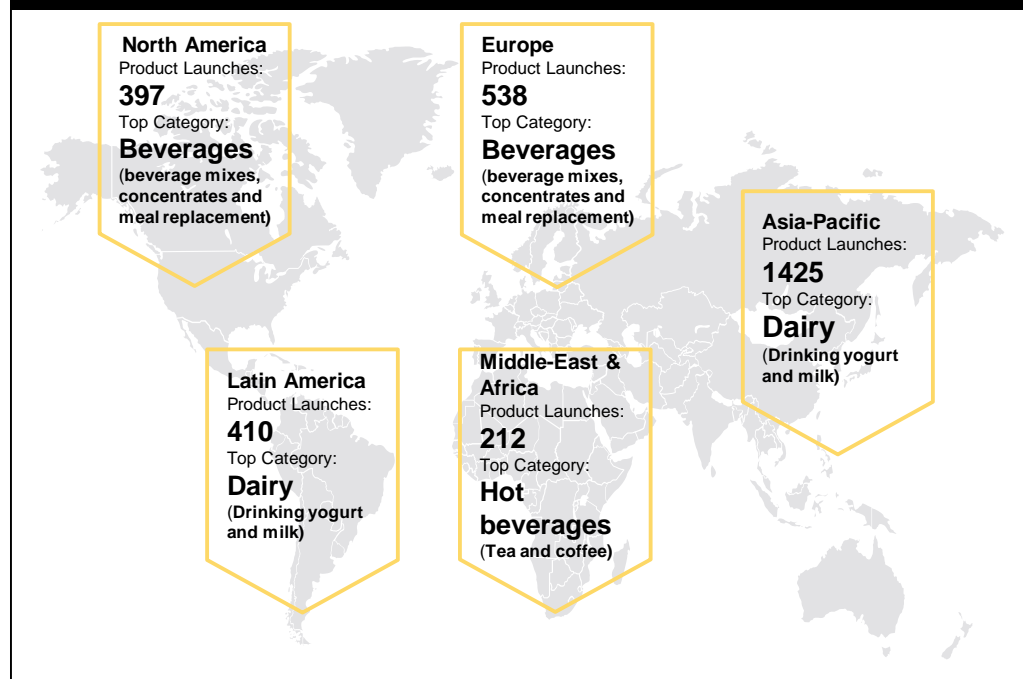
Player Strategy: Product Launch

Highest number of product launch are observed in Asia-Pacific followed by Europe. Dairy is the most utilized category with functional digestive and slimming claims

Product Launch



Product launches with functional claims by different geographies in 2H-2019



*Functional claims include: Probiotics, Prebiotics, Functional digestive and Functional slimming

Investment Summary 2H 2019

The demand for superfoods products has prompted an investment in-flow in 2H-2019. Superfood companies are also attracting investments directed towards novel product development









FutureBridge Insight:

- High number of **investments were observed in US region** because of **high consumer awareness** and demand for functional foods **in this region**.
- There is **well rounded development** in all the **segments like probiotics, superfoods and fermented foods**
- The investments **will provide startups an opportunity expand in different geographies** as well as **retail outlets**.
- Established players like **Danone** and **Coca-Cola** are investing in **probiotics and kombucha** startups to **capitalize on the demand of trending products**.
- Other significant investment included **Cove kombucha (Canada) gaining \$1.2 million from Canaccord Genuity Wealth Management** and the company will utilize the **funds in team expansion, revamp of packaging** and launching new varieties.

Source: Company websites, Newsletters

Active Players: Key Startups Jul 2019 - Dec 2019

Startups are actively raising funds for advancing their market presence and expansion of product lines in order to appeal to higher consumer base

TECHNOLOGY	RECENT ACTIVITIES
 <p>Seed Health is a microbial sciences company that develops live biotherapeutics, which utilizes bacteria to influence human and environmental health.</p>	<p>Seed Health partners with Atmo Biosciences to utilize Atmo's Gas Capsule technology for clinical studies on their flagship probiotic, the Daily Synbiotic</p>
 <p>Evolve BioSystems develops products to establish, restore, and maintain a healthy human gut microbiome. The company has partnered with multiple universities to prove efficacy of its probiotics</p>	<p>Reckitt Benckiser Group (UK) has partnered with Evolve BioSystems (US) for sales of Evivo</p>
 <p>Synbiotic Health is nutritional ingredients company and it develops synergistic synbiotics that provide health benefits, which are proven and demonstrated through clinical studies</p>	<p>Synbiotic Health partnered with NUtech Ventures. The company also opened a lab at University of Nebraska's Lincoln campus</p>
 <p>Rowdy Mermaid Kombucha produces kombucha drinks in small scalable batches using natural, fresh ingredients. All products are made from ethically-sourced wildcrafted plants and Bangladeshi teas</p>	<p>Rowdy Mermaid expanded into larger Boulder headquarter to increase distribution. The company also announced national retail availability of its new aluminum cans</p>
 <p>Cove kombucha produces a kombucha drinks using fresh, ethically sourced and organic loose leaf tea. The teas are fermented for over a month</p>	<p>Cove kombucha has raised \$1.2 million in its latest funding round led by Canaccord Genuity Wealth Management, which is a Vancouver-based investment bank</p>
 <p>Prenexus Health produces AmpliVida XOS (Xylooligosaccharide) ingredient that is focused to improve digestive health and metabolism. It will be marketed and sold in partnership with DSM.</p>	<p>Prenexus Health received a GRAS for XOS prebiotic at levels up to 2.4 grams per day, in different foods</p>

Things to watch out for!

- Development of **novel microbiome based biotherapeutics**
- **Patent filings for improvements on existing technologies**
- **Collaborations to utilize R&D capabilities** to form advanced supplements
- **GRAS certifications** for novel ingredient, that will help in **commercialization of products**
- **Usage of trending claims** to promote products **like yogurts, milks, snack bars**
- **Attractive packaging** to make the products stand out

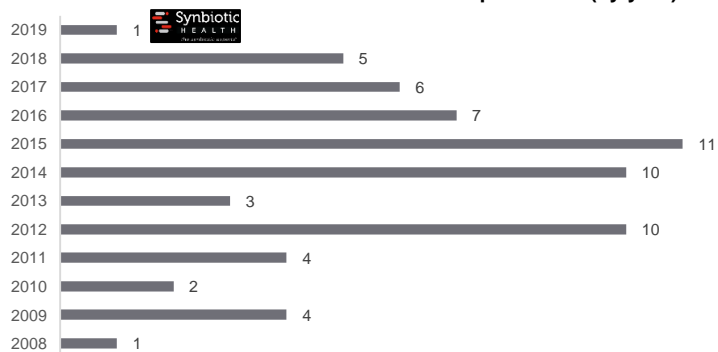
Source: Company websites, Newsletters

Startup Scenario analyzed for 2019: Active startups based on developments in 2019

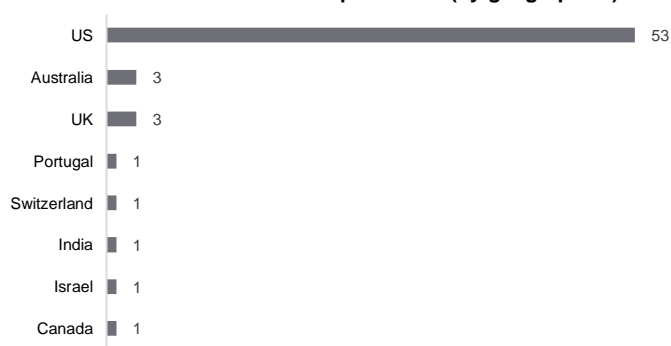
The startups from 2015 are well established and recognized among consumers and so these are showing maximum activity as these companies are launching new products and expanding.

When was startup activity more prevalent and what are the current trends?

Number of active startups in 2019 (by year)



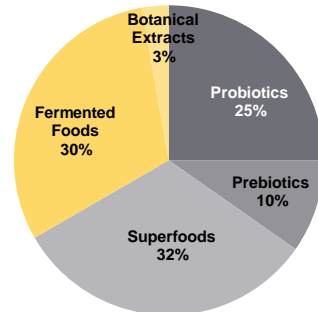
Number of active startups in 2019 (by geographies)



Top active startups Jul 2019-Dec 2019



Number of active startups in 2019 (by segment)



FutureBridge Viewpoints

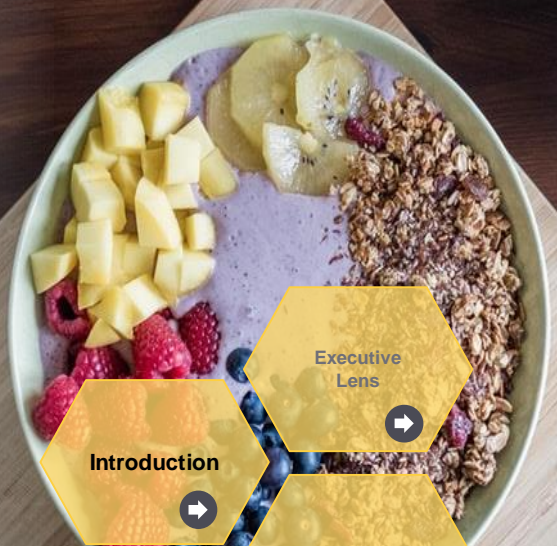
Out of the most active startups in 2019:

- US has emerged as a **hotspot** for startup incorporation and activity
- **Most** of the active **startups** are incorporated in **2015** as these companies have a **well established product** and **consumer base** hence these are highly active
- **Superfoods** segment has the **highest startup activity**, followed by **rending kombucha** or **kefir startups** of fermented foods domain

02

INTRODUCTION

Introduction to the Functional Foods for Metabolic Health domain: Study approach, Key drivers and challenges



Introduction to Functional Foods for Metabolic Health

INTRODUCTION

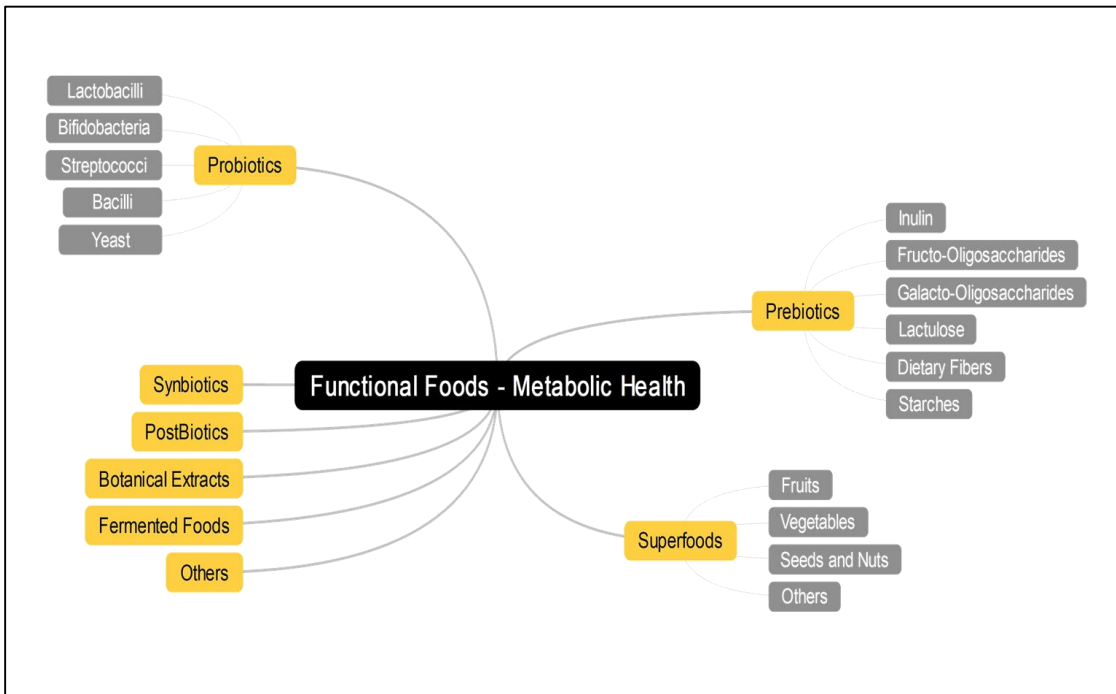
- **Metabolic Health** trend is divided into **7 sub-categories** which include: Probiotics, Prebiotics, Synbiotics, PostBiotics, Superfoods, Fermented Foods and Botanical Extracts. Together these ingredients and products contribute in boosting **gut health, metabolism, to fight obesity, and metabolic disorders**
- Foods capable of **preventing or curing certain health conditions or diseases** are termed as 'functional foods'. To be classified as functional, the **food must demonstrate its effects when consumed in amounts** that can be normally included in regular diet
- Variety of functional foods are available in the market, which **allows food manufacturer to formulate a innovative food and beverage products** that are nutritious, healthy and can boost gut health

ACTIVE PLAYER OF 2H-2019

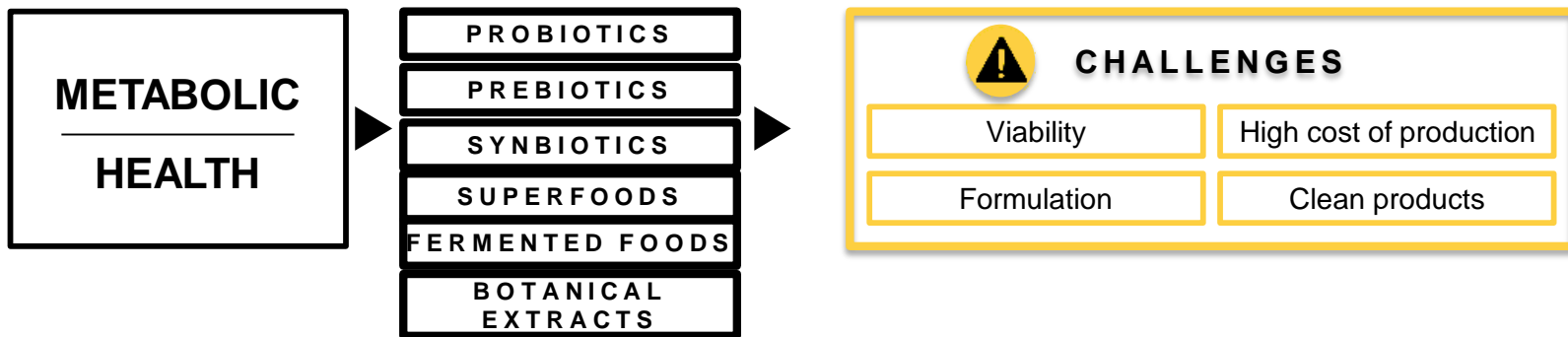


CLASSIFICATION OF FUNCTIONAL FOODS FOR METABOLIC HEALTH

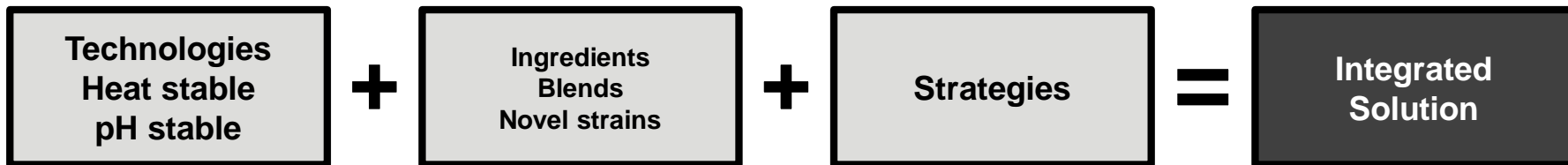
Metabolic Health trend are classified in this report primarily based on the ingredients and products that are available in the market which has the potential to boost metabolism or gut health.



Continuous research into healthy alternatives for boosting metabolism has led to innovation around a variety of bacterial strains, blended probiotics, prebiotics, and superfoods. However, maintaining its efficacy and stability is still a challenge.

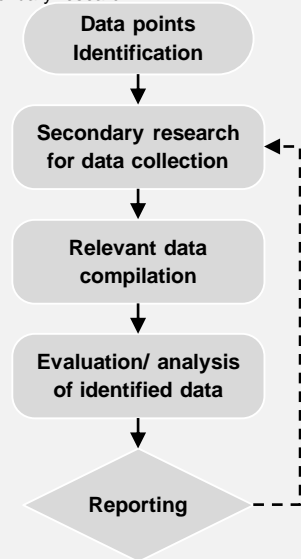


Each functional food segment has unique challenges. Thus, every ingredient and segments needs a separate strategy to mitigate the challenges.

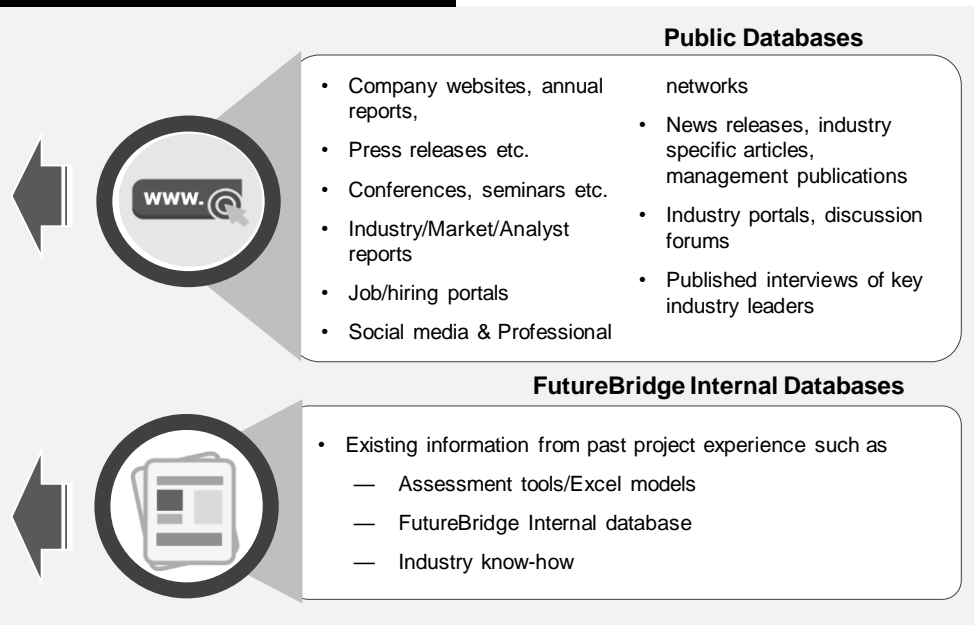


Study Approach

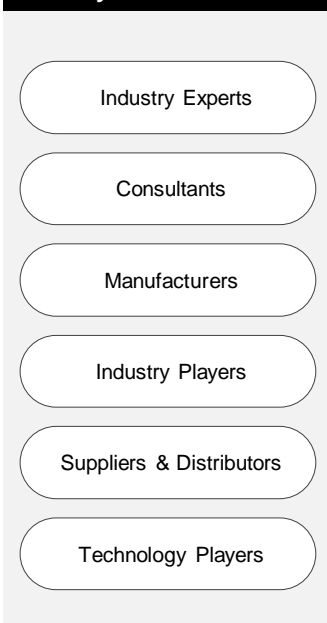
- FutureBridge refers to multiple sources of information for identified data points and utilize this information to validate the project findings
- FutureBridge follows systematic approach for secondary research



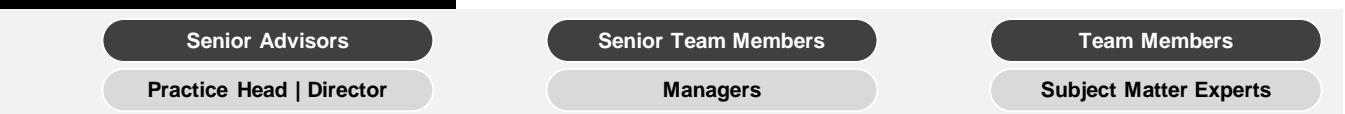
Secondary Research Sources



Primary Research Sources



Team Structure



03

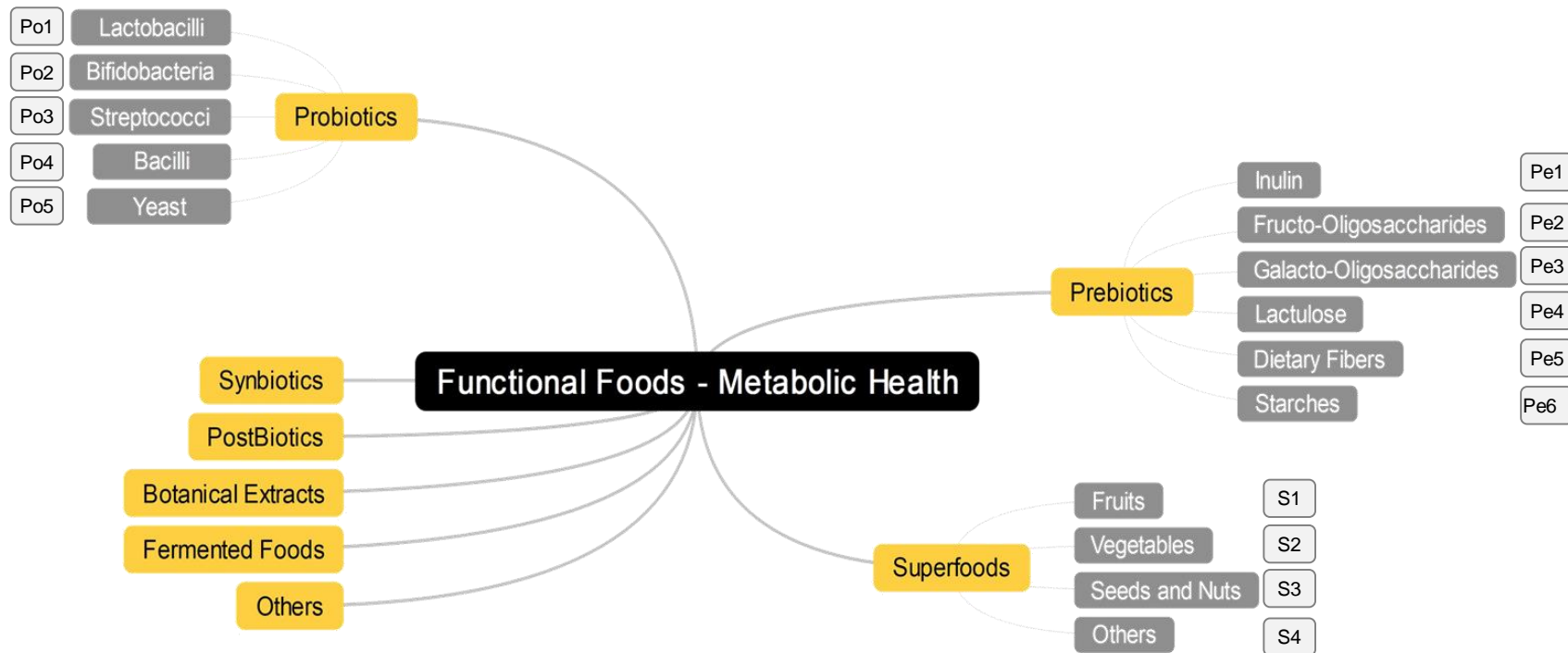
TECHNOLOGIES

Trending technologies for the development of Functional Foods for Metabolic Health products



Technology Spread

Functional ingredients defined play a vital role in gut fermentation and contribute to systemic effects of the body



Probiotics – Technology Introduction

Companies are focusing on developing enhanced microbial strains using probiotic biotechnology in various applications such as dairy, non-dairy beverages, baked goods etc.

INTRODUCTION

- Probiotics are live microorganisms ingested to improve intestinal conditions by creating a balance of microbial fauna in the gut; these microorganisms are often referred to as “**good bacteria**,” but probiotic organisms also include yeasts
- The global probiotics market is expected to reach \$64.02 billion USD by 2022

APPLICATIONS

- Dairy
- Non-dairy beverages
- Baked goods
- Dietary supplements
- Cereals
- Meat products

TYPES

Different sources of probiotics and their respective Health Claims

SOURCE	HEALTH CLAIMS
Lactobacillus	<ul style="list-style-type: none"> • Improving gastrointestinal tract • Immune functions and infections
Bifidobacteria	<ul style="list-style-type: none"> • Improving gastrointestinal tract • Immune functions and infections
Streptococcus	<ul style="list-style-type: none"> • Prevention of rise in fasting plasma glucose • Positive effects on systolic blood pressure
Yeast	<ul style="list-style-type: none"> • Improving gastrointestinal tract • Intestinal infections • Antibiotic-associated diarrhea

Note: ¹For more details, please check “Q2_2019-Pulse-MH” >>

TECHNOLOGY TRENDS

- **Dairy products** have traditionally dominated the **probiotics** market and continue to do so
- **Non-dairy products** like chocolate, cereals, and beverages are under increasing focus for **new product developments**
- Companies are also focusing on developing enhanced microbial strains using probiotic biotechnology and introducing probiotics for animal feed. Culture concentrates of different strains are available in dried or deep-freeze forms
- Many newly developed probiotic strains are still in infant stages of their development and sales, yet to go mainstream
- **Fortification** of products by probiotics, combined with inclusion of other **functional nutrients** and **superfood** ingredients is an ongoing trend product innovation trend
- Use of probiotics in some food categories is difficult due to stability and functional issues; most microorganisms find it difficult to survive rigorous processing steps
- This is now being overcome through use of “**stable**” **probiotic technology**; more resilient organisms (e.g. *Bacilli*) and improved delivery systems are making it easier to formulate probiotics into new products and formulations
- Players are also **borrowing from traditional knowledge bases** and utilizing knowledge of regional fermented foods, which in itself has developed into a segment of its own within functional foods
- Ingredient manufacturers viz. strain developers and suppliers have been pushing new product development through in-house support to F&B partners; this has led to certain strains being popularized as “versatile” and “dependable” probiotic ingredient
- **DuPont Nutrition & Health** has [shared](#) new analysis that emphasizes on benefits of its **Howaru Shape probiotic strain for weight management**

Lactobacillus – Technology Introduction

Lactobacillus is used in dairy products. Big players are focusing on developing encapsulation technologies to protect *Lactobacillus* in the gut, to increase its efficacy and stability

INTRODUCTION

- Major Strains: *L. casei*, *L. helveticus*, *L. johnsonii*, *L. paracasei*, *L. plantarum*, *L. reuterii*, *L. rhamnosus*, *L. Fermentum*
- Lactobacillus is a lactic acid bacteria **commensal to humans** and traditionally used in dairy products. It plays a key role in souring of raw milk to form **yogurt, cheese and other dairy products**
- The bacteria feeds only on sugars and **require minor nutrients for growth** and are the **most common** probiotic strains and helps in restoration of microbial fauna in the human GI tract

TECHNICAL ASPECTS

- Major developments are in the area of increasing efficacy and improving stability of the organism during storage and in the gut, especially through delivery systems like encapsulation
- Lallemand** has **patented** a microencapsulation technique, **Probiocap**. The technique involves coating of freeze-dried lactobacillus with fatty acids, which allows it to sustain in harsh environments
- A Danish-Korean company has also developed a **dual coating technology for lactobacillus**, wherein the first layer is made of soy peptide and second layer of cellulose and gum

PRODUCTS



Stage 1 Iron Fortified Milk-Based Infant Formula



Strawberry and Banana & Peach Non-Fat Yogurt



Coconut Blended Low-Fat Greek Yogurt



Coconut Yogurt

APPLICATIONS

- Fermented milk
- Yogurt
- Probiotic drinks
- Kimchi
- Food supplements
- Infant formula

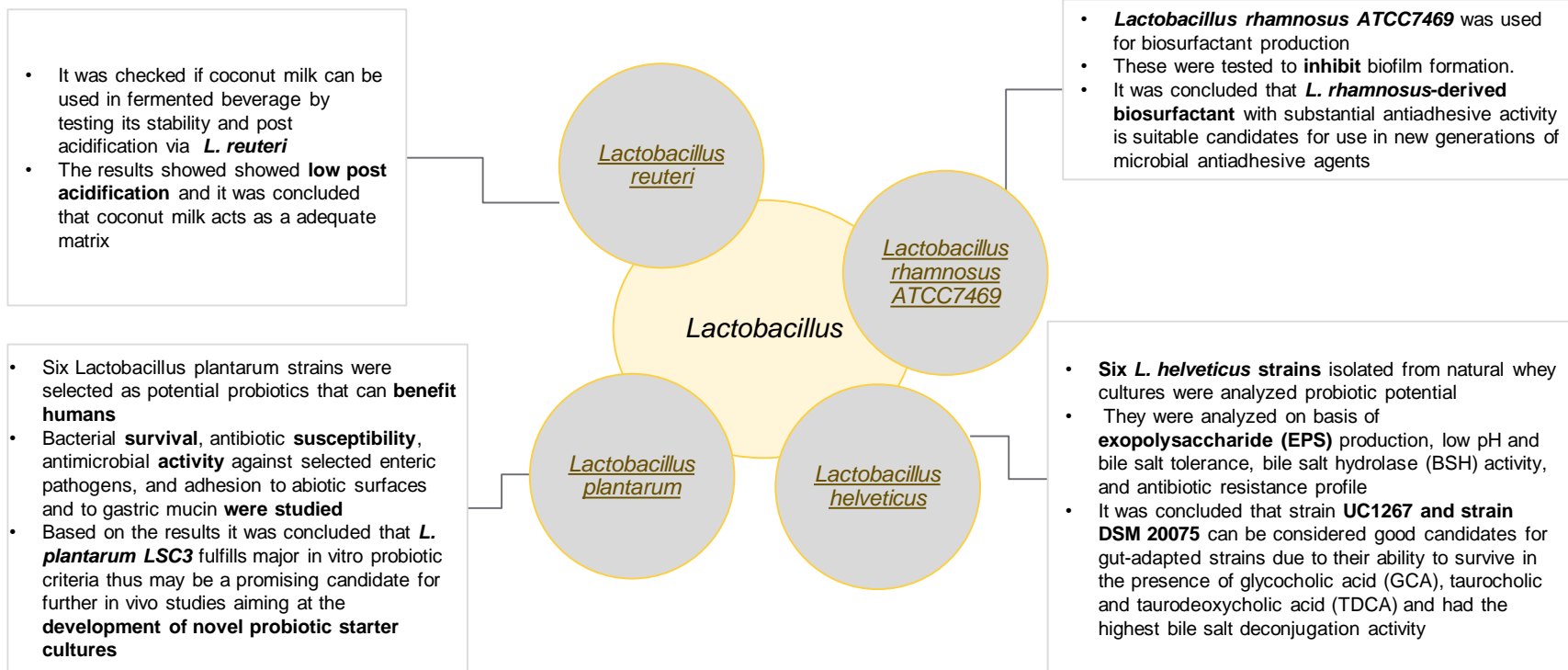
MATERIALS/SOLUTIONS & PLAYERS INVOLVED

FOOD MANUFACTURERS

INGREDIENT MANUFACTURERS

Lactobacillus – Technology Introduction

A lot of research is ongoing on lactobacillus and the major focus is on testing and finding novel strains that have probiotic potential and can improve human health



*Source: Research papers

Bifidobacteria – Technology Introduction

Bifidobacterium is most abundantly found in infants and prevents against Gastrointestinal disorders . Companies are developing novel technologies to protect *Bifidobacterium* in the gut

INTRODUCTION

- Major Strains: *Bifidobacterium breve*, *Bifidobacterium infantis*, *Bifidobacterium lactis*
- Bifidobacterium are **naturally present in human intestine** and most abundantly found in infants, with their numbers decreasing with age
- These bacteria are **effective in treating lactose intolerance** and **diseases of gastrointestinal tract**. *Bifidobacterium longum* and *Bifidobacterium breve* have reported to decrease tumor risks. They also help in mineral absorption

TECHNICAL ASPECTS

- Several species **lack the ability to withstand the harsh conditions** of the GI tract as compared to lactobacillus
- **Polymers of alginate/glycerol, gums, alginate/pectin/whey**, modified waxy maize starch protein, etc., are **used for encapsulation of bacteria to help them survive detrimental conditions**
- Use of **prebiotics is another technique used for enhancing organisms' viability** in formulation. Prebiotics stimulate growth of bacteria and could also be used as a carrier material for spray drying; British Biologicals has developed **ProGurt**, which is a combination of probiotics and prebiotics using their patented **PRIME technology**

APPLICATIONS

- Beverage
- Infant formula
- Fermented dairy products

MATERIALS/SOLUTIONS & PLAYERS INVOLVED

FOOD MANUFACTURERS



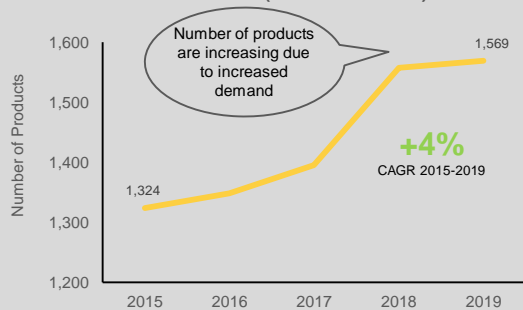
INGREDIENT MANUFACTURERS



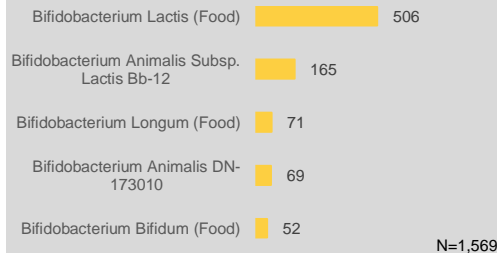
Bifidobacteria – Technology Introduction

Products incorporating *Bifidobacterium* probiotic mainly target gut health. Established F&B players are globally launching dairy products using this probiotic

Food and beverage product launches tracked with Bifidobacterium (Global 2015-2019)



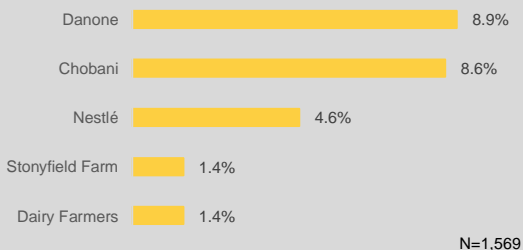
Top 5 Bifidobacterium strains tracked in food and beverages with Bifidobacterium (Global, 2019)



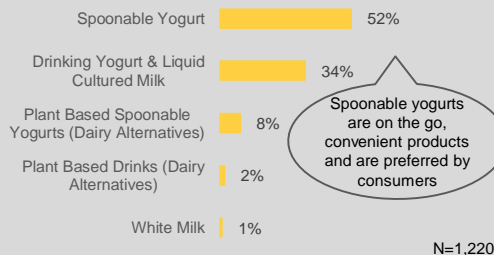
MOST UTILIZED STRAINS AND PRODUCTS

Strain	Company	Category	Product
<i>Bifidobacterium bifidum</i>	Protein World (UK)	Meal replacements & other drinks	Chocolate Flavor Meal Replacement Shake
<i>Bifidobacterium longum</i>	Shimmy Shimmy (UK)	Plant-based spoonable yogurt	Coconut Kefir Yoghurt Alternative
<i>Bifidobacterium animalis</i>	Danone (Switzerland)	Spoonable yogurt	Strawberry Yogurt
<i>Bifidobacterium lactis</i>	Nestlé (Canada)	Baby food	Iron and Calcium Fortified Milk-Based Infant Formula
<i>Bifidobacterium infantis</i>	The Collective (UK)	Spoonable yogurt	Mango 'n' Turmeric Kefir Cultured Yogurt
<i>Bifidobacterium breve</i>	Nutricia (Australia)	Baby food	Sensitive Premium Infant Formula

Top 5 companies launching food and beverages tracked with Bifidobacterium (Global, 2019)



Top 5 dairy sub-categories tracked in dairy products with Bifidobacterium (Global, 2019)



Note: [For more details, please check "Q4_2019-Pulse-MH" >>](#)

Streptococcus – Technology Introduction

Streptococcus is a lactic acid bacteria commonly used in fermentation of cheese and yogurt. It prevents indigestion and improves immunity. Streptococci and lactobacilli work synergistically

INTRODUCTION

- Major Strains: *Streptococcus thermophilus*
- Streptococcus thermophilus*** is a lactic acid bacteria commonly used in fermentation of cheese and yogurt
- It is associated with a number of **health benefits including preventing indigestion** and improving immunity
- Studies have proven **streptococcus to survive the GI tract and colonize after ingestion**. Streptococci have been used in therapy to balance bacterial populations after prolonged antibiotic usage and are known to bind to epithelial cells of the intestine

TECHNICAL ASPECTS

- Streptococcus species are mostly **used in consortia** and **as co-cultures**, along with other lactic acid bacteria
- Streptococci are rarely used in single-species formulations, as it displays **synergistic effects when used in co-culture with other probiotic bacteria**
- Streptococci and lactobacilli specifically work synergistically**; each species generates co-factors required by the other for growth
- Key functionalities associated with streptococcus include **improvement of lactose metabolism**: Streptococci generally produce high levels of lactase, the enzyme responsible for breaking down lactose, alleviating lactose intolerance in humans

PLAYERS INVOLVED



*Source: Research papers

FEATURES

- It is a **non-pathogenic gram positive bacteria** and it has optimal growth temperature range of **35 - 42 °C**
- It comes under facultative anaerobe, i.e. it can still produce ATP through **fermentation** in presence as well as absence of oxygen
- S. thermophilus* produces **low moisture cheddar cheese** due to its low chymosin activity and its ability to hydrolyze hydrophobic peptides decreases the bitterness in cheese

APPLICATIONS

- Yogurt**
- Fermented milk**
- Drinking yogurt**

RESEARCH

Journal: [Microorganisms](#)

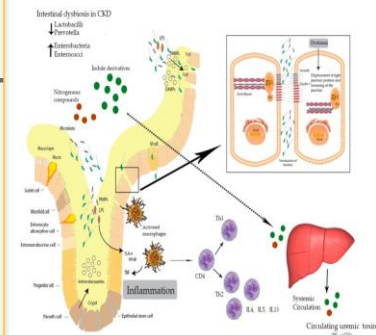
Title: Gut Dysbiosis and the Intestinal Microbiome: *Streptococcus thermophilus* a Key Probiotic for Reducing Uremia

Overview

In this review the efficacy of probiotics and probiotic bacterium *Streptococcus thermophilus* as an important modulator of uremic toxins in the gut of patients diagnosed with chronic kidney disease. In conjunction with prudent nutritional practices it may be possible to prevent the progression of CKD and significantly downregulate mucosal pro-inflammatory activity with the administration of probiotics that contain *S. thermophilus*.

Authors

Vitetta L1, Llewellyn H, and Oldfield D



Bacillus – Technology Introduction

Bacillus a facultative anaerobic bacteria which shows increased tolerance and survival capabilities in the acidic environmental conditions of GIT. It has applications in Dairy, Processed Food, Beverages etc.

INTRODUCTION

- Major Strains: *Bacillus coagulans*
- Bacillus spp* is a **facultative anaerobic bacteria** showing **increased tolerance and survival capabilities** in the acidic environmental conditions of gastrointestinal tract. They are therefore being increasingly explored for correcting metabolic disorders such as diarrhea and other related microbial infections
- Symbiotic and synergistic effects of the strains have been reported; *B. coagulans* and **fructo-oligosaccharide (FOS)** are reportedly active in **decreasing chances of antibiotic treatment associated gut health issues**

TECHNICAL ASPECTS

- Proprietary probiotic strains of this bacteria include *B. coagulans* Unique IS-2 by Viva5 Corporation, **ProDURA *Bacillus coagulans*** by Nebraska Cultures, and *B. coagulans* MTCC5856 by Sabinsa Corporation
- Sabinsa Corporation** has **received** a patent for its **Lactospore (*B. coagulans* MTCC5856)** probiotic and its use in irritable bowel syndrome (IBS) by managing its symptoms, such as bloating and abdominal pain
- Microencapsulation** of these bacteria helps maintain stability and also protects the bacteria from harsh conditions

PLAYERS INVOLVED



FEATURES

- Bacillus* species are **found in higher concentrations in soil, water, and food products** that have a plant origin
- They have an their **ability to form endospores** and so they remain stable in probiotic products much longer than conventional probiotics
- The **main species** of *Bacillus* used as probiotics include ***B. subtilis*, *B. coagulans*, *B. clausii*, *B. pumilus*, *B. licheniformis*, *B. cereus*, *B. laterosporus*, *B. polyfermenticus*, and *B. polymyxa***

RESEARCH

Patent: [CN110521939](#)

Title: A kind of probiotics fermentation food and preparation method thereof adjusting intestinal health

Overview

The invention relates to microbial fermentation application fields, and in particular to a kind of functional food and preparation method thereof by the segmentation solid state fermentation soya bean production of a variety of probiotics. The probiotics fermentation functional food provided by the present invention for adjusting intestinal health is will to mix access probiotics after soybean powder with water in proportion to carry out segmentation solid state fermentation and obtain. The probiotics includes *lactobacillus reuteri*, *bifidobacterium longum*, *Pediococcus acidilactici*, *lactobacillus plantarum*, *animal bifidobacteria*, *lactobacillus paracasei*, *bifidobacterium adolescentis*, *bacillus coagulans* and *bacillus subtilis*. By probiotics fermentation, increase the benefit active in soybean, and keep it more easily digested, enhance its health-care efficacy to body, the health of body can also be adjusted and be played a significant role.

Assignee

Tianjin Chuangyuan Biotechnology



Yeast – Technology Introduction

Yeast probiotics, unlike bacterial probiotics, function through antagonistic activity against pathogens. Companies are exploring opportunities for its other probiotic applications

INTRODUCTION

- Major strains: *Saccharomyces boulardii*
- Yeast have been in use as probiotics since early 1950, but as a therapeutic in diarrhea treatment. Recent studies have encouraged the use of these yeasts in food formulations
- Yeasts also contain dietary fibers, proteins, and bioactive compounds that have been postulated to provide synergistic effects in probiotic formulations
- It can be used in applications like beverages, breads, buns, fermented dairy products and yogurts

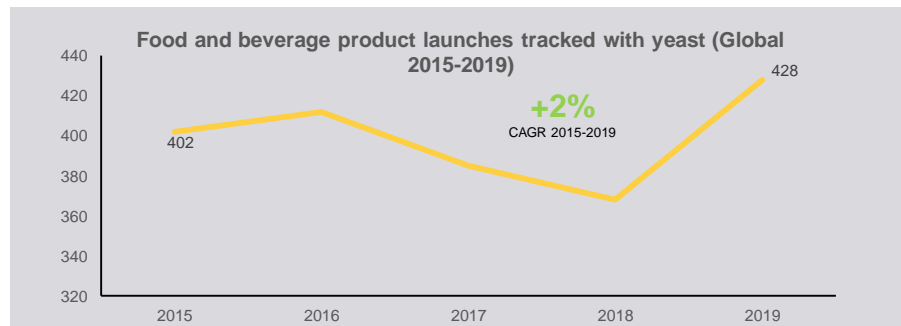
TECHNICAL ASPECTS

- Yeast probiotics, as opposed to bacterial probiotics, function through antagonistic activity against pathogens
- Gnosis-bio has patented a formulation consisting of *Saccharomyces boulardii* and enzyme superoxide dismutase effective in reducing risks of syndromes related to obesity
- *Saccharomyces boulardii* is the most common probiotic microorganism reported to have beneficial gastrointestinal effects. It is effective against intestinal pathogens such as *Salmonella*, *Shigella*, and *Clostridium*, and also offers high resistance to acidic pH and high temperature

PLAYERS INVOLVED



PRODUCTS UTILIZING YEAST



Source: Mintel

RELEVANT PRODUCTS



Product: Pink Grapefruit Immune Drink Mix
Category: Beverage Mixes
Company: Walmart



Product: Quinoa Crispiers & Seed Mix with Spirulina & Herbs Flavor
Category: Snack Mixes
Company: Flow Foods



Product: Bio Kefir Drink with Grapefruit and Ginger
Category: Drinking Yogurt
Company: Danone



Product: Organic Hard Cheese
Category: Hard Cheese & Semi-Hard Cheese
Company: Zemaityjos Pienase



Product: Power Greens Kombucha
Category: Meal Replacements & Other Drinks
Company: Health-Ade Kombucha

Prebiotics– Technology Introduction

Prebiotics promote growth of commensal and probiotic microorganisms involved in gut function. They have applications in dairy, beverages, baking, confectionary etc. They promote metabolic health

INTRODUCTION

- Prebiotics are **dietary ingredients** that **promote growth of commensal** and **probiotic microorganisms** involved in gut function. Such ingredients (mostly fibers) are not digested in the human GI tract but can be metabolized by microbes present in the GI tract, thereby promoting growth of the micro flora
- **Currently** known prebiotics are predominantly **carbohydrates**, with **inulin**, **galacto-oligosaccharides**, and **fructo-oligosaccharides** leading commercially

APPLICATIONS

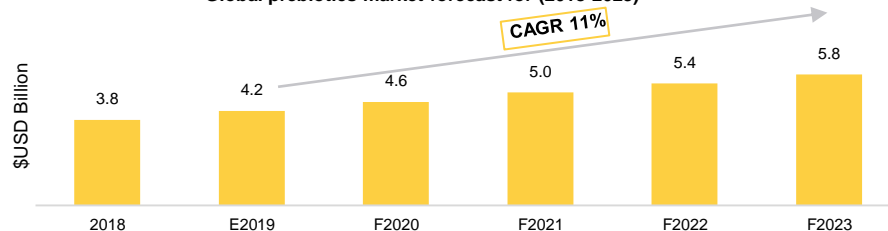
- Dairy
- Beverages
- Baked goods
- Infant formula
- Cereals
- Meat products
- Canned foods
- Confectionary

Different sources of prebiotics and their respective Health Claims

SOURCE	HEALTH CLAIMS
Inulin	<ul style="list-style-type: none"> • Maintaining blood glucose level • Maintain nitrogen balance • Modulation of the intestinal microorganisms
Galacto-oligosaccharides	<ul style="list-style-type: none"> • Enhancing mineral absorption • Allergy mitigation
Fructo-oligosaccharides	<ul style="list-style-type: none"> • Stimulate lactobacilli and bifidobacteria in the intestine • Suppress growth of harmful bacteria in colon • Stimulate bifidobacteria in the intestine
Lactulose	<ul style="list-style-type: none"> • Treatment of hepatic encephalopathy

PREBIOTICS MARKET

Global prebiotics market forecast for (2018-2023)



Source: Newsletter, Company websites, Statista

TECHNOLOGY TRENDS

- Interest in **treating gut-associated problems** by replacing therapeutic pills and capsules drives the **prebiotic** market
- Consumer perception of the ingredient as natural and non-naturally derived determine preference and acceptance of prebiotic components as natural and non-naturally derived ingredients
- This has led to players in the F&B industry to use **natural claims** and natural sounding ingredients to launch prebiotic products; this is being backed up by research in the area of sourcing of such ingredients
- A common strategy has been to utilize the natural source of the prebiotic to project the natural aspects of the same; **appropriate communication through labeling of ingredients** and claims are widely adopted
- Tagging with the **natural plant source** also enables associating the health claims of the raw material to the food product
- Research is being directed towards finding **novel sources of ingredients** that display prebiotic benefits, such as Yacon (*Smallanthus sonchifolius*) root and *Morinda officinalis* (Indian mulberry); inulin-type fructans can be isolated from the roots of *M. officinalis*
- Researchers at University of California have investigated **production of prebiotics from waste streams**; they have identified prebiotic components from hazelnut skins, which is a leftover from the food industry

Prebiotics– Research

There has been an increased activity in the field of research utilizing functional prebiotics to treat diabetes, obesity and other metabolic syndromes

PROBIOTICS

PREBIOTICS

SYMBIOTICS

POSTBIOTICS

SUPERFOODS

FERMENTED
FOODSBOTANICAL
EXTRACTS

Title

Gut commensal *Parabacteroides goldsteinii* plays a predominant role in the anti-obesity effects of polysaccharides isolated from *Hirsutella sinensis*

Journal

Gut

Impact
Factor

17.94

Overview

The medicinal fungus *Ophiocordyceps sinensis* and *Hirsutella sinensis* have been used in Chinese medicine for their immunomodulatory properties. Alterations of the gut microbiota have been described in obesity and type 2 diabetes, these are analyzed in mice and it was concluded that HSM polysaccharides and the gut bacterium *P. goldsteinii* represent novel prebiotics and probiotics that may be used to treat obesity and type 2 diabetes.

Author

Wu TR, Lin CS, Chang CJ *e.t al.*

Prebiotics and Probiotics in Digestive Health

Clinical Gastroenterology and Hepatology

7.89

The review paper talks about importance of the gut microbiota in health and disease, and how it can be modulated by using prebiotics and probiotics. It can also restore balance when it is believed bacterial homeostasis has been disturbed in disease. It talks about the challenges that confront the investigator who seeks to explore microbiota modulation in either healthy populations or those who suffer from common digestive ailments.

Eamonn M.M.Quigley

Functional and therapeutic potential of inulin: A comprehensive review.

Critical reviews in food science and nutrition

6.07

The review article presents a comprehensive overview on both technological and therapeutic potential of inulin. It is known to impart certain nutritional and therapeutic benefits that improve health and reduce the risk of many lifestyle related diseases. Additionally, it can be used as a functional ingredient, Inulin has been adopted in various efficacy studies involving animal and human studies to function as a prebiotic. Inulin promotes good digestive health, influencing lipid metabolism ensuring optimum levels of glucose and insulin.

Ahmed W and Rashid S

The Role of Probiotics and Prebiotics in the Prevention and Treatment of Obesity

Nutrients

4.17

The paper talks about new therapeutic strategies to treat/prevent obesity have been proposed, based on pre- and/or probiotic modulation of gut microbiota to mimic that found in healthy non-obese subjects. Based on human and animal studies. This review aimed to discuss mechanisms through which gut microbiota could act as a key modifier of obesity and related metabolic complications.

Tomás Cerdó, José Antonio García-Santos, Mercedes G. Bermúdez *e.t al.*

Potential prebiotics and their transmission mechanisms: Recent approaches

Journal of Food and Drug Analysis

4.17

This review highlights the importance of prebiotics in immunomodulation and nutrient absorption abilities of gut. It also suggests new prebiotics transmission strategies with higher penetrating capacity such as microencapsulation. In addition to this it talks about use of prebiotics in health-related issues such as diabetes and inflammatory bowel disease (IBS).

Ishu Khangwal and Pratyooosh Shukla

Inulin – Technology Introduction

Inulin is a naturally occurring oligosaccharide, is non-digestible in the human GI tract, and gets fermented in the small intestine. Chicory root is the primary source for inulin. It improves gut health

INTRODUCTION

- **Inulin** is a naturally occurring **oligosaccharide**, is non-digestible in the human GI tract, and gets fermented in the small intestine
- **Chicory root** is the **primary source for inulin** and is the major raw material for commercial production; other dietary sources include asparagus, wheat, and garlic
- Inulin helps in improving gut health and lowers the risk factors associated with metabolic syndrome
- Studies have suggested that **inulin increases immunoglobulin levels** in the gut and stimulates immune function

TECHNICAL ASPECTS

- **Inulin** is soluble in hot water, making it a **perfect additive for beverages**. It can also be used to **substitute sugar** and flour in food products
- **Solid-liquid extraction methods** have been traditionally used for extracting inulin; lately, **microwave-assisted extraction and pulse electric field (PEF)** extraction of inulin from chicory roots are being explored
- Inulin extract derived from chicory root has also been **identified as a ideal fat replacer in cookies**. Even at a fat replacement of **40%** the cookies did not show any significant difference in sensory quality while providing prebiotic benefits

PLAYERS INVOLVED



FEATURES

- Some plants that contain large quantities of inulin are **Jerusalem artichoke, chicory root, garlic, asparagus root, salsify and dandelion root**
- The isolation process of inulin from plants basically consists of three steps: **extraction** of water-soluble components, including inulin, from chicory root; **purification** to remove impurities and finally **spray drying**
- Inulin is **not digested or absorbed in the stomach**. It goes to the intestine where it supports the growth of a healthy bacteria

RESEARCH

Journal: [Critical reviews in food science and nutrition](#)

Title: Functional and therapeutic potential of inulin: A comprehensive review.

Overview

The review article presents a comprehensive overview on both techno-functional and therapeutic potential of inulin. It is known to impart certain nutritional and therapeutic benefits that improve health and reduce the risk of many lifestyle related diseases. Additionally, it can be used as a functional ingredient. Inulin has been adopted in various efficacy studies involving animal and human studies to function as a prebiotic. Inulin promotes good digestive health, influencing lipid metabolism ensuring optimum levels of glucose and insulin. It was concluded that inulin holds promising technological and functional characteristics that can truly be imparted in certain food applications (bakery and dairy products). Additionally, dietary sources of inulin can be promising health promoting ingredient. Additionally, inulin as fat replacer can be effectively utilized to formulate low calorie foods without imparting any deleterious effects on consumer's health.

Authors

Ahmed W and Rashid S

APPLICATIONS

- **Dairy Products**
- **Chocolates**
- **Beverages**
- **Baked goods**
- **Processed Foods**

Fructo-Oligosaccharides – Technology Introduction

Fructo-Oligosaccharides (FOS) is produced through solid-state fermentation of by-products from industry, and improves metabolic health

INTRODUCTION

- Fructo-oligosaccharides (FOS) occur naturally in vegetable sources such as onion, yacón, Jerusalem artichoke, asparagus, garlic, and banana
- FOS is studied to have beneficial health effects, such as improving mineral absorption and lowering serum cholesterol, phospholipids, and triacylglycerols
- In the EU, quantity of FOS in baby foods is restricted by government regulations, and Canada does not permit addition of FOS to baby foods and formula

TECHNICAL ASPECTS

- FOS is produced through solid-state fermentation of by-products from industry, transfructosylation of sucrose, or extraction from plants; use of immobilized enzymes is proposed as a economic method for scalable FOS production
- Aspergillus japonicus JN19*, *Rhizopus stolonifer LAU07*, *Aspergillus phoenicis*, etc., have been investigated to produce fructosyltransferase enzyme that in turn produce FOS; submerged fermentation techniques have also been proposed for the same

PLAYERS INVOLVED

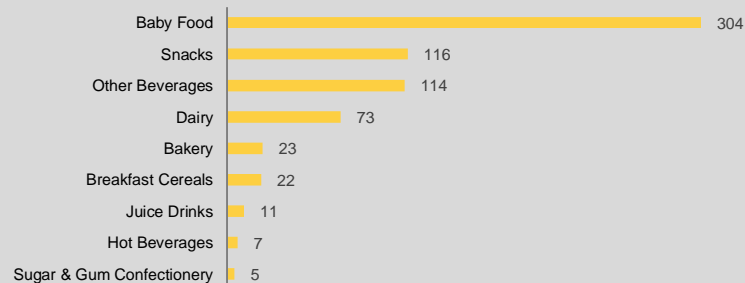


APPLICATIONS

- Beverages
- Infant formula
- Dietary supplements
- Animal feed
- Pharmaceuticals
- Dairy products

CATEGORIES AND PRODUCTS

Top categories utilizing fructo-oligosaccharides (2019)



RELEVANT PRODUCTS



Walnut and Oat Flavoured Fermented Milk



Comfort Milk Powder



Orange Flavored Nutritional Supplement for Pregnant and Lactating Women



Gape Juice



Classic Vanilla Flavored Nutritional Drink

Galacto-Oligosaccharides – Technology Introduction

Galacto-Oligosaccharides (GOS) are non-digestible chains of simple sugars, which are used as prebiotics. GOS are naturally found in human milk and it improves gut health. Major applications are baby food & dairy

INTRODUCTION

- Galacto-oligosaccharides (GOS) are **non-digestible chains of simple sugars** used as an established prebiotic for lactobacilli and bifidobacteria by clinical studies.
- Chickpeas, green peas, and kidney beans** are rich in GOS. Also, GOS are naturally found in human milk
- It has also been reported that **GOS in combination with fructo-oligosaccharides (FOS) and omega-3 fatty acids can help reduce respiratory infections in children**
- Intestinal bacterial growth due to GOS are known to be much superior than other types of prebiotics

TECHNICAL ASPECTS

- Studies have reported that a **combination of fructo-oligosaccharides and GOS can modify the bowel function** similar to that of an infant fed with breast milk
- Baby food and dairy** are the **leading segments** in incorporating GOS, and are often paired with probiotics in products such as yogurt and similar drinks
- GOS can be **produced enzymatically from lactose** by using **β -galactosidases**, for food applications

PLAYERS INVOLVED



APPLICATIONS

- Infant formulas
- Beverages
- Fermented milks
- Confectionary
- Baked goods

RESEARCH

Journal: [Nutrients](#)

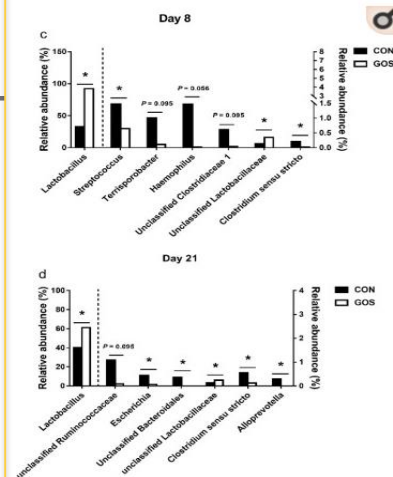
Title: Changes in Ileal Microbial Composition and Microbial Metabolism by an Early-Life Galacto-Oligosaccharides Intervention in a Neonatal Porcine Model.

Overview

- Galacto-oligosaccharides (GOS), functional oligosaccharides, are important active substances in milk that play an important role in the development of intestinal microbiota and the immune system of newborns. The intestinal maturation of piglets resembles that of human newborns and infants. Therefore, we used the newborn piglet model to study the effects of early-life GOS intervention.
- Results revealed that ileal microbiota composition was significantly enriched in Lactobacillus and unclassified Lactobacillaceae, and reduced in Clostridium sensu stricto on day 8 and day 21 after GOS intervention, Escherichia significantly decreased on day 21 following the early-life GOS intervention

Authors

Tian S, Wang J, Yu H, Wang J, and Zhu W 1.



Lactulose – Technology Introduction

Lactulose can be produced from various methods like alkaline isomerization process of lactose, enzymatic methods. Lactulose prevents intestinal side-effects

INTRODUCTION

- Lactulose is a **non-digestible synthetic disaccharide consisting of galactose and fructose**, traditionally used for treating hepatic encephalopathy and constipation and is a part of WHO prescribed List of Essential Medicines
- It is produced by **isomerization of lactose** and available in liquid and crystalline forms.
- Presence of lactulose has been known to **boost the number of bifidobacteria** and reduce bacteroides in humans
- Lactulose present in fermented dairy product with lactic acid bacteria can **help prevent intestinal side effects**

TECHNICAL ASPECTS

- Lactulose is **commercially produced by alkaline isomerization process of lactose**; boric acid or aluminate are used as catalysts to obtain high yields
- However, this method requires further separation of byproducts and produces waste that makes the overall **process expensive**
- Enzymatic method** is a popular alternative for producing lactulose through a clean, **convenient, and cost-effective manner**. *Arthrobacter sp* and *P. furiosus* producing β -galactosidase and β -glycosidases respectively can be used for transglycosylation of lactose for lactulose synthesis

PLAYERS INVOLVED

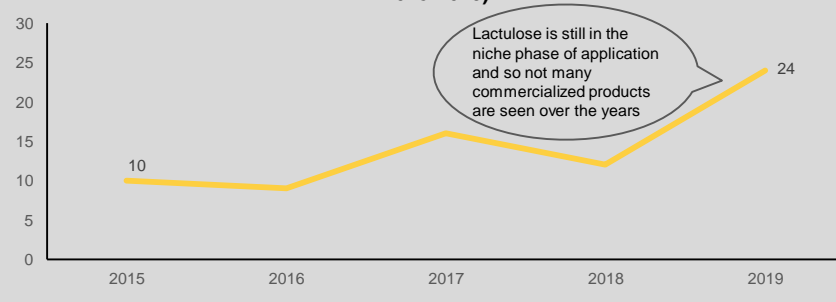


APPLICATIONS

- Pharmaceuticals
- Nutraceuticals
- Dairy products

MATERIALS/SOLUTIONS & PLAYERS INVOLVED

Food and beverage product launches tracked with yeast (Global 2015-2019)



Strawberry Milk Powder



Detox & Cleansing Drink Mix



Yogurt Drink



Chocolate Flavored Drink Powder



Coffee Flavor Drink

Dietary Fibres – Technology Introduction

Dietary Fibres are being incorporated in a number of processed foods that effectively contribute to blood sugar, cholesterol, weight loss and gut health

INTRODUCTION AND FEATURES

- The increasing demand for functional foods is stated to be the key driver for the increased use of dietary fibers in foods and beverages
- The cereals and grains segment accounts for the largest market share in dietary fibers whereas North American market accounts for largest geographical market share
- Soluble fibers adsorb bile acid and cholesterol whereas insoluble fibers promote bowel movement
- A recent research by scientists at Sahlgrenska Academy have reported the mechanisms of how fibers contribute to colonic health

RECENT DEVELOPMENTS

- A [study](#) conducted at the **Rutgers University** has shown that a high fiber diet can help deal with Type II Diabetes
- **FDA** delays defining 'dietary fibers' as the new Nutrition Facts Label will require products to include measurements of the dietary fiber content in the product

PLAYERS INVOLVED



TATE & LYLE



beneo
researching great food and health



APPLICATIONS

- Pharmaceuticals
- Animal Feed
- Processed Foods
- Dairy Products

RELEVANT PRODUCTS



Company: Mead Johnson, Mexico

Features: Nutri Pantera formula, a combination dietary fiber, of 23 vitamins and minerals, is kosher certified and comes in premix form

Ingredients: Sugar, corn syrup solids, cocoa, phosphorus, soy lecithin, maltodextrin, artificial churro flavor, natural churro, vitamins and minerals

Claims: Improve digestion



Product: Probiotic Drink + Prebiotic Fiber

Company: Dutch Mill, Thailand

Features: Claimed to contain active cultures of probiotics and prebiotics fibre and is certified halal, is available in 100 ml pack

Ingredients: Recombined skimmed milk, sugar, Lactobacillus paracasei, prebiotic fiber

Claims: Promotes digestion



Product: Growing Up Milk with Vegetable Oils and Fibers

Company: Nestlé, Brazil

Features: Gluten-free product contains Prebio 1 dietary fiber with fructooligosaccharides and inulin, which contributes to the balance of the intestinal flora. It is rich in vitamins and minerals

Ingredients: Semi-skimmed milk, whey (deproteinized, demineralised), maltodextrin, whey, corn oil, lactose, low erucic acid canola oil, fructooligosaccharides, palm olein, inulin, vitamins and minerals

Claims: Promotes digestion

*Source: Mintel, Company Website

Starches – Technology Introduction

Starch such as tapioca can help in improving gut associated immune and microbiota modulation and in production of SCFAs

INTRODUCTION AND FEATURES

- **Tapioca** is one of the most used **complex starch**, extracted from the **cassava plant**. It is native to Brazil
- Tapioca is **gluten-free** and is a common ingredient in many gluten-free manufactured foods because it helps improve texture and moisture in the absence of gluten
- It helps to **ease inflammation and balance gut flora** and minerals that perform many important functions throughout your body

ADVANTAGES

- This **resists in digestion by human pancreatic amylase** in the small intestine and thus, reach the colon
- **Regular consumption results in gut associated immune and microbiota modulation** as well as a significant production of **SCFAs**
- It helps to **increase laxation, reduce risk of digestive tract cancers**, lowering postprandial glucose response and lowering blood lipid levels, prevents gallstone formation

PLAYERS INVOLVED



APPLICATIONS

- Pharmaceuticals
- Snacks
- Processed Foods
- Dairy Products

RELEVANT PRODUCTS



Product: Fermented Milk with Probiotics, Chia and Blueberry

Company: Danone, Brazil

Features: Semi-skimmed product is gluten free, contains flavoring, is said to be made with five types of ferment, billions of natural probiotics and chia super grains

Ingredients: semi-skimmed product is gluten free, contains flavoring, is said to be made with five types of ferment, billions of natural probiotics and chia super grains

Claims: Contain Prebiotics

Product: Raspberry Truffle Flavored Protein Bar

Company: NuGo Nutrition, USA

Features: Kosher certified product is free from gluten, GMO, maltitol and artificial sweetener, and has 17g of protein, 2g of sugar, and 7g of fiber. The dietary supplement retails in a 45g pack.

Ingredients: protein mix, tapioca starch isolated milk whey protein, calcium caseinate, rice protein, chicoryroot, vegetable glycerin, dark chocolate (cocoa liqueur, sugar cane, cocoa butte

Claims: Promotes weight loss



Product: Strawberry and Raspberry Yogurt

Company: VBD, Russia

Features: made with selected milk and berries, and contains lacto bacteria. It features 20% less sugar, 2.5% fat, probiotic micro-organisms, prebiotic, and vitamins

Ingredients: Normalised milk, fruit filler strawberry and raspberry (water, sugar, concentrated fruit juice, thickener, natural strawberry flavour, natural raspberry flavour, acidity regulator, tapioca starch, whey protein

Claims: Contains probiotics and prebiotics

*Source: Mintel, Company Website

Synbiotics – Technology Introduction

Synbiotics provide additional benefits as compared to pro or prebiotics alone and they are more stable and have a better survival rate in GI tract

INTRODUCTION

- **Gibson and Roberfroid** introduced the term of “**synbiotic**”. They described it as “a mixture of **probiotics** and **prebiotics** that beneficially affects the host by **improving the survival and implantation of live microbial dietary supplements in the GI tract**, by stimulating the growth of health-promoting bacteria
- The principal purpose of that type of combination is improvement of **survival of probiotic microorganisms** in the gastrointestinal tract. Synbiotics have both **probiotic and prebiotic properties** and were created in order to overcome some possible difficulties in survival of probiotics in the gastrointestinal tract

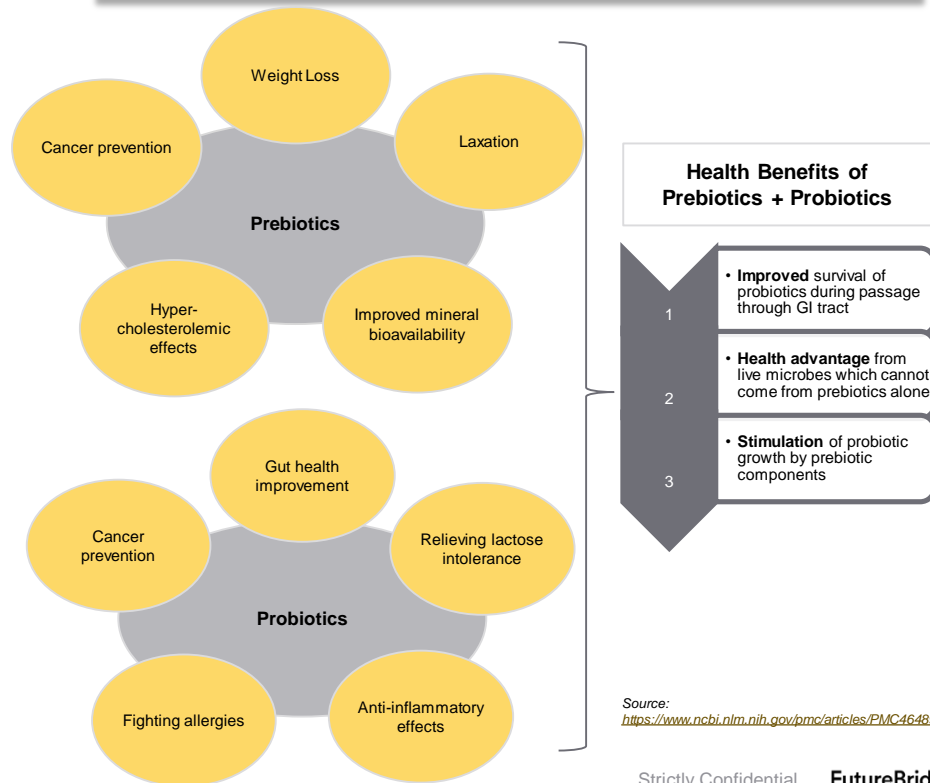
TECHNICAL ASPECTS

- Synbiotics result in **reduced concentrations of undesirable metabolites**, as well as the inactivation of nitrosamines and cancerogenic substances. Their use leads to a significant **increase of levels of short-chain fatty acids, ketones, carbon disulphides, and methyl acetates**, which potentially results in a positive effect on the host's health
- The probiotic strains used in synbiotic formulations include **Lactobacilli, Bifidobacteria spp, S. boulardii, B. coagulans etc.**, while the major prebiotics used comprise of oligosaccharides like **fructooligosaccharide (FOS), GOS and xyloseoligosaccharide (XOS), inulin**, prebiotics from natural sources like **chicory and yacon roots**, etc.

ADVANTAGES

- The health benefits claimed by synbiotics consumption by humans include:
- **Increased levels of lactobacilli and bifidobacteria** and balanced gut microbiota
 - **Improvement of liver function** in cirrhotic patients
 - **Improvement of immunomodulating** ability
 - **Prevention of bacterial translocation** and **reduced incidences of nosocomial infections** in surgical patients

SYNBIOTICS BENEFITS



Synbiotics – Technology Snapshot

Mostly synbiotics are being popularised in infant nutrition products like milk powders but slowly these are being incorporated in beverages as well

APPLICATIONS

- Animal feed
- Infant food
- Dairy products
- Nutraceuticals
- Beverages
- Foods

FEATURES

- **Danone Nutricia** Research have developed specific combinations of **synbiotics for treatment of allergy symptoms** in infants. The company is also studying synbiotic combinations to **support the development of immune system**
- **Probiotal S.p.A.** has patented a synbiotic containing **Bifidobacterium genera and galacto-oligosaccharides (GOS), fructo-oligosaccharides (FOS) and inulin** for use in infant foods

RECENT DEVELOPMENTS AND RESEARCH

- According to a study, led by Dianne DellaValle, PhD, RDN, LDN, synbiotics like **Sunfiber**, a purified guar fiber prebiotic, with 8 billion CFU of a **Bifidobacterium** improve gut health as well as iron uptake in female athletes.
- A recent study showed that consumption of synbiotics resulted in alterations of the gut microbiota and its metabolism, and may support improved **gut barrier function** and **obesity-related markers**
- With the growing dairy industry in **China, India and New Zealand, Asia Pacific** is expected to be a promising market for synbiotics in future. This has led to European manufacturers dealing with infant formulas shifting base to Japan and China, owing to the low cost of production. The growth of food and beverage industry is **Middle East** is also expected to open **new market opportunities** for synbiotics in future

Note: *For more details, please check "1H_2019-Trend_Deep_Dive-BMH" >>*

PATENT

Patent: [EP3556226](#)

Title: Complex synbiotic for establishing healthy intestinal flora

Overview

The invention relates to a material composition for establishing a health-promoting gut flora, characterized by the fact, that two or more prebiotics and two or more probiotics includes the material composition. Preferably the material composition as a tablet and contains at least one probiotic bacteria selected from the group comprising *Lactobacillus plantarum*, *Lactobacillus acidophilus*, *Lactobacillus paracasei*, *Bifidobacterium longum*, *Bifidobacterium lactis* and/or *Bifidobacterium bifidum*, and a prebiotic selected from the group comprising topinambou, Baobab, Inulin, Konjakwurzel, alginat, Agar-Agar, guar, Xanthan and/or components thereof.

Assignee

Raab Vitalfood GmbH

Inventors

Andreas RaabCorinna Spieß

Figure 1

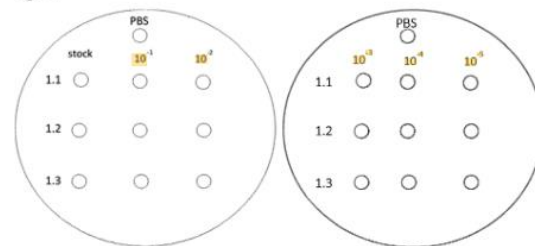
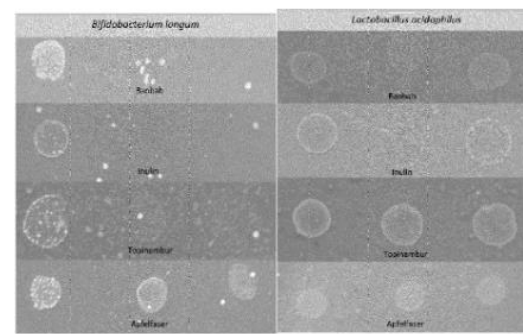


Figure 2



Postbiotics – Technology Introduction

These are bioactive elements that can offer physiological benefits to hosts and there are claims that these affect gut health, liver function and circulatory functions

INTRODUCTION

- Postbiotics, also known as either **metabiotics, biogenics, or simply metabolites/CFS (cell-free supernatants)**; refers to soluble factors (products or metabolic byproducts) secreted by live bacteria or released after bacterial lysis. These byproducts offer **physiological benefits** to the host by providing additional bioactivity
- Postbiotics possess different **functional properties** including, but not limited to, **antimicrobial, antioxidant, and immunomodulatory**. These properties can positively affect the microbiota **homeostasis and/or the host metabolic** and signaling pathways, thus affecting specific physiological, immunological, neuro-hormone biological, **regulatory and metabolic reactions**

TECHNICAL ASPECTS

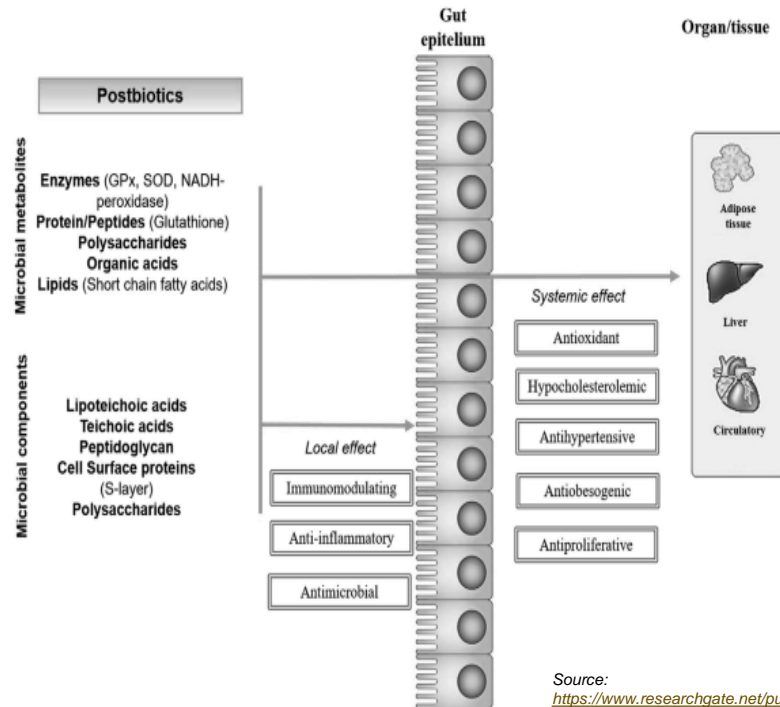
- Generally, postbiotics possess several attractive properties such as **clear chemical structures, safety dose parameters, and longer shelf life** (up to 5 years, when used as ingredient for foods and beverages or as nutritional supplements)
- In addition, **research performed by Shenderov** revealed that postbiotics have favorable absorption, metabolism, distribution, and excretion abilities, which could indicate a high capacity to signal different organs and tissues in the host thus eliciting several biological responses
- Postbiotics have been obtained by using **cell disruption techniques**, which include **heat and enzymatic treatments, solvent extraction** as well as **sonication**

ADVANTAGES

The health benefits claimed by postbiotics consumption by humans include

- Treatment of inflammatory conditions** including irritable bowel disease (IBD) or irritable bowel syndrome
- Helps in **reducing obesity and skin problems**, including acne or eczema
- Helps to **treat gut-related problems** such as leaky gut syndrome, dysbiosis or small intestine bacterial overgrowth

EFFECTS OF POSTBIOTICS



Source:
https://www.researchgate.net/publication/323661298_Postbiotics_An_evolution_term_within_the_functional_foods_field

Postbiotics – Technology Snapshot

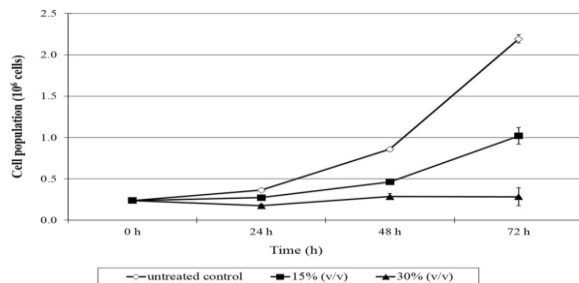
Postbiotics are still in nascent phase and even though new research is being going on in this domian still very few companies have commercialized their products containing postbiotics

APPLICATIONS

- Animal feed
- Infant food
- Dairy products
- Nutraceuticals
- Beverages
- Foods

RESEARCH

- Recent research in the field of postbiotics is focusing on **Lactobacillus** strains
- *Lactobacillus rhamnosus* GG was studied for its **effect on Intestinal Barrier Function** and a novel protein called **HM0539** was identified that exhibits a potent protective effect on the **intestinal barrier**, as reflected by **enhancing intestinal mucin expression** and preventing against lipopolysaccharide (LPS)- or tumor necrosis factor α (TNF- α)-induced intestinal barrier injury, including downregulation of intestinal mucin (MUC2), zonula occludens-1 (ZO-1) and **disruption of the intestinal integrity**
- Another study was published that identifies the postbiotic metabolites produced by **Lactobacillus plantarum** strains ad their cytotoxic effects on cancer cells, for this six variants were selected and they exhibited selective cytotoxicity via antiproliferative effect and induction of apoptosis against malignant cancer cells. This reveals the **vast potentials of PM from L. plantarum** as functional supplement and as an adjunctive treatment for cancer



RELEVANT PRODUCTS



Dark Chocolate Gluten Free Cookies with Postbiotics Lactobacillus



Chocolate Chips Gluten Free Cookies with Postbiotics Lactobacillus



Caramelized Strawberry Gluten Free Cookies with Postbiotics Lactobacillus



Oatmeal Raisin Gluten Free Cookies with Postbiotics Lactobacillus

Product: Postbiotic based cookies in a variety of flavors

Company: Verlin, Indonesia

Features: Contains **BioAXTive postbiotic lactobacillus** contains red rice, brown rice, oats, chia seeds, flax seeds and palm sugar.

All products are free from gluten, wheat, egg, dairy, nut, MSG, preservatives and artificial colours and are halal certified

Ingredients: Ground red rice, ground brown rice, oat, chia seed, flax seed, baking soda, cinnamon, palm sugar, vegetable oil, sea salt, **bioAXTive B2-series (postbiotic lactobacillus (L. acidophilus))**

Claims: Support digestive health

*Source: Mintel, Company Website

- Postbiotic are in **nascent phase** and still there is a lot of research going on regarding their benefits
- There are very few players which have entered this domain and have **commercialized products** with added postbiotics
- One of such companies is Verlin which has launched postbiotic cookies in multiple flavors and it contains **BioAXTive postbiotic along with Lactobacillus acidophilus**
- The products are designed for babies from 0-4 years and they boost digestive health and in addition to that these are gluten-free, vegan and are free from major allergens like eggs, nuts and dairy and preservatives and hence are a **nutritious healthy alternative**

Superfoods – Technology Introduction

Superfoods have rich phytochemical compositions and have good disease-fighting ability. Superfoods contribute to overall health. Due to high demand for plant based diets, companies are exploring novel plant sources of superfoods

INTRODUCTION

- Superfoods differ from other functional foods due to **rich phytochemical compositions** known for their disease-fighting ability
- These foods are **not restricted to treating specific diseases, but contribute to overall health** and well-being. European Union has banned health claims present on food and beverage products unless supported by scientific evidence

APPLICATION

- Dairy products
- Bakery and cereals
- Dietary supplements
- Beverages
- Processed foods

Different sources of Superfoods and their respective Health Claims

SOURCE	TYPES	MEDICAL APPLICATIONS
Fruits	Strawberries, blueberries, pomegranates, apples	<ul style="list-style-type: none"> • Rich in vitamins, soluble fiber, and phytochemicals • Flavonoids present in blueberries help reduce risks of heart conditions
Vegetables	Spinach, kale, avocado, tomatoes	<ul style="list-style-type: none"> • Loaded with vitamin A, C, and K, fiber, and calcium • Helps improve bone density and reduce risks of fractures
Seeds and Nuts	Almonds, walnuts, cashews, whole grains	<ul style="list-style-type: none"> • Provide fibers, omega-3 fatty acids, and healthy fats • Chia seed helps in diabetes and body hydration
Others	Oats, quinoa	<ul style="list-style-type: none"> • Helps in retaining muscle mass • Oats help in controlling blood sugar

Note: *For more details, please check "1H_2019-Trend_Deep_Dive-BMH" >>*

TECHNOLOGY TRENDS

- With consumers demanding more plant-based diets, companies are exploring novel plant sources of superfoods
- F&B players are focusing on incorporation of these ingredients into food products, majorly snacks and beverages and extending claims to the food product
- In 2019, trending superfoods include **seaweed, cassava flour, chaga mushrooms, chia seeds and maqui berries**
- **B.O.S.S. Food Co.** [modified](#) its superfoods bars Move fit energy bar, Think brainpower bar, Smile upbeat focus bar by increasing brown rice and pea protein fermented with shiitake mushrooms, prebiotic fiber and by removing sugar. The reformulated bars contains prebiotic tapioca fiber and superfood ingredients such as **blueberries, walnuts, almonds, hemp seeds, aronia berries, maqui berries, noni fruit, rooibos tea and raw cacao powder**
- **Your Super**, which is a plant-based superfood mix brand, has [raised](#) \$5 million in series A round of funding which was led by PowerPlant Ventures. Your Super's mixes are made with five to six ingredients and have varieties including supergreen mix, matcha mix etc. These contain superfoods and functional ingredients such as **matcha, moringa, wheatgrass, barley, chia seeds, cacao, acai, blueberry, guarana, banana, baobab**
- **Kuli Kuli**, moringa based superfood company [raised](#) \$5 million in a Series B round co-led by Griffith Foods and eighteen94 capital. The funds were intended to launch its **moringa ingredient arm while continuing to scale its moringa powder, bars and shots business**

Berries – Technology Introduction

Berries are the upcoming nutrient-rich ingredients for F&B products

INTRODUCTION

- **Berries** are the upcoming **nutrient-rich superfoods**, high in antioxidants, which are known to fight the ills of aging
- Researchers also claim that **berries have high concentrations of anthocyanin, an antioxidant** that may help lower blood pressure and improve blood vessel function
- According to a recent study, women who consumed more than three servings of blueberries a week had a 34% lower heart attack risk, compared to those who ate less
- **Maqui berry contains high level of vitamin C**, calcium, iron and potassium, anthocyanins and polyphenols, and anti-inflammatory compounds. It has now been **used in many dietary supplements**

APPLICATION

- Beverages
- Bakery products
- Dairy products
- Salads
- Dietary supplements

Berries and their respective nutrient content

SUPERFOOD	NUTRIENT CONTENT
Goji berry	Vitamin A, Vitamin C, Calcium, Iron
Blueberry	Fiber, Vitamin C, Vitamin K, Manganese, Carbohydrates
Acai berry	Sodium, Fiber, Protein, Vitamin A, Calcium
Golden berry	Fiber, Vitamin A, Antioxidants
Maqui berry	Sodium, Potassium, Fiber, Protein, Vitamin A, Vitamin C, Calcium, Iron

TECHNOLOGY TREND

- New technology trends implemented by companies include introduction of berry powder in salad dressings
- Berries combined with superfood seeds are also being used in preparation of sandwich biscuit fillings

MATERIALS/SOLUTIONS & PLAYERS INVOLVED



Product: Raspberry Cheesecake Protein Bar
Category: Snack/Cereal/Energy Bars
Company: Hormel Foods, Australia



Product: Berry Oxidant Drink
Category: Juice
Company: Tru Blu Beverages, Australia



Product: Mixed Berry with Açai Coconut Yoghurt
Category: Plant Based Spoonable Yogurts (Dairy Alternatives)
Company: Chalmers Organics, New Zealand



Product: Crispy Riceberry Bar with White Sesame Seeds
Category: Snack/Cereal/Energy Bars
Company: Siam Crispy Rice Group, Thailand



Product: Morning Berry Protein Flapjacks
Category: Snack/Cereal/Energy Bars
Company: Natural Balance Foods, UK



Product: Mixed Fruit Beverage with the Power of Sea Buckthorn
Category: Juice drinks
Company: Seabuckthorn Beverages, India

*Source: Mintel, Company Website

Ginger – Technology Introduction

Ginger consumption can help in improvement of digestion, reducing gut inflammation, and enhancement of nutrient absorption

INTRODUCTION

- Ginger is used in teas, ginger ale, ginger beers, ginger bread, gingersnap cookies, and ginger biscuits. It is **used almost globally**
- It is known to contain volatile oils such as zingerone, shogaols, and gingerols, which are responsible for its characteristic flavor and odor, with **anti-bacterial, anti-viral, anti-fungal, and anti-parasitic properties**
- **Improvement of digestion, reducing gut inflammation, and enhancement of nutrient absorption** are other beneficial properties attributed to the plant
- Other benefits include reduction of fever-related nausea and motion and morning sickness
- Nutrient content per 6g: Protein: 0.11g, Carbohydrates: 1.07g, Fat: 0.05g, Fiber: 0.12g, B-Complex Vitamins, Fat Soluble Vitamins, Minerals, Amino Acids

MATERIALS/SOLUTIONS & PLAYERS INVOLVED



RECENT DEVELOPMENTS

- Wild Tonic kombucha **launches** new can packaging in its 12 flavors Goji Rose, Mango Ginger, Tropical Turmeric etc.
- Tyson Foods has **launched** Pact, a new brand dealing with functional refrigerated protein snacks. The snack bites are launched in four varieties: Gut Instinct Cranberry + Kombucha Probiotic, Gut Ahead Turmeric + Ginger Prebiotic, and Vibe On Mint Matcha + Blueberry Energizing

TECHNOLOGY INFORMATION

- Ginger is generally **prepared for processing by washing and drying**. Washing is done by immersion in boiling water, which also inactivates enzymatic processes, followed by drying
- Another processing method involves **scraping, peeling, or slicing of rhizomes prior to drying**. After the procedure of **peeling and washing, rhizomes are first soaked in water for two to three hours**, then steeped in a solution of 1.5% to 2.0% lime (calcium oxide) for six hours followed by drying. Drying is performed to 8%-10% moisture and not exceeding 12%; drying may be performed in the sun or with hot air at a temperature not exceeding 60 °C to avoid darkening and discoloration
- **Ginger oil is extracted by steam distillation**. Dried rhizomes are powdered and loaded into a still. Steam is then passed through the powder, entraining the volatile components, which are further condensed with cold water. Oil separates from the water by cooling. Increase in oil yield is achieved by cohobation, or re-distillation

APPLICATIONS

- Bakery products
- Beverages
- Dairy products

ADVANTAGES

- According to recent studies, ginger **prevents motion sickness**, including dizziness, nausea, vomiting, and cold sweating
- Gingerols in ginger **may inhibit the growth of human colorectal cancer cells**

DISADVANTAGES

- Some people with allergy to ginger may get **mouth itching** and irritation if they consume ginger
- Consumption of excess ginger can **lower blood pressure**

Seeds – Technology Introduction

Pumpkin seeds are high in phosphorus and manganese and important antioxidants. They also contain the amino acid tryptophan, which helps in lowering anxiety

INTRODUCTION

- Seeds contain vitamins and minerals. Consumption of seeds helps in maintaining a healthy immune system, **improve blood circulation, and control blood pressure**
- Pumpkin seeds are high in phosphorus** and manganese and important antioxidants. They also contain the amino acid tryptophan, which helps in lowering anxiety
- Flax seeds are rich in alpha-linolenic acid, phytochemicals,** and **fiber**, which can reduce total blood cholesterol and protect against cardiovascular diseases

APPLICATION

- Cooking
- Dairy products
- Beverages
- Salads
- Bakery products
- Processed foods
- Seed sprouts

Seeds and their respective nutrient content

SUPERFOOD	NUTRIENT CONTENT
Chia	Fiber, Protein, Fat, Calcium, Manganese, Magnesium, Phosphorus
Quinoa	Protein, Fiber, Manganese, Magnesium, Phosphorus, Folate, Copper, Iron
Cacao beans	Saturated Fat, Sodium, Carbohydrates, Fiber, Protein, Iron, Calcium
Pumpkin seed	Fats, Carbohydrates, Protein, Vitamins, Minerals
Flaxseed	Omega-3, Fiber, Protein, Vitamin B1, Manganese, Magnesium, Phosphorus, Selenium

TECHNOLOGY TREND

- Recent technology involves incorporation of seed flour in preparation of breads for maintaining health
- Few companies have also introduced seeds in packed salads for direct consumption in consumers' diets
- Quinoa is also used in soups
- Cocoa has been used in fruit-based chocolates, which are rich in nutrients

MATERIALS/SOLUTIONS & PLAYERS INVOLVED



Product: Probiotic Chocolate Sea Salt Granola
Category: Breakfast cereal
Company: Target, USA



Product: Cocoa & Coconut Probiotic Granola
Category: Breakfast cereal
Company: Bio&Me, UK



Product: Yogurt with Fruit, Red Beetroot, Chia Seeds and ActiRegularis Bacteria
Category: Drinking Yogurt
Company: Danone, Czech Republic



Product: Oatmeal, Quinoa and Chia Seed Flavored Grain Milkshake
Category: Flavored Milk
Company: Inner Mongolia Yili Industrial Group, China



Product: Multi-Seed Oat with Linseed, Black Sesame and Chia
Category: Breakfast cereals
Company: ESP - Evercrisp Snack Productos, Chile



Product: Lite Crunchy Waffle with Chia and Honey
Category: Biscuits
Company: Class A Food Industries, Egypt

*Source: Mintel, Company Website

Chia – Technology Introduction

Chia seeds are a nutrient-rich, tasteless, easy-to-digest type of superfood

INTRODUCTION

- **Chia seeds** are tiny black seeds from the plant *Salvia hispanica*, native to South America
- Chia seeds are a nutrient-rich, tasteless, easy-to-digest type of superfood.
- They **contain protein, antioxidants, calcium, and are rich in omega-3 fatty acids**; they also contains ALA (alpha linolenic fatty acid)
- According to Mintel, in the period 2014 and 2015, launch of food and drink products containing chia increased by 70%
- **Nutrient content per 1 ounce:** Fiber: 11 grams, Protein: 4 grams, Fat: 9 grams, Calcium: 18% of the RDA, Manganese: 30% of the RDA, Magnesium: 30% of the RDA, Phosphorus: 27% of the RDA

MATERIALS/SOLUTIONS & PLAYERS INVOLVED



RECENT DEVELOPMENTS

- **Audrey's Chia** has [launched](#) a line of original chia cookie flavors. These are available in **Lemon, Almond, Chocolate Chip and Peanut Butter**. Chia seeds are an excellent source of fiber, omega-3 fatty acids and antioxidants and they help in improving metabolism and gut health

TECHNICAL INFORMATION

- Chia contains high amounts of (u)-3 fatty acids, which play a very **important** role, especially during **fetal and infant growth**, and also in prevention of cardiovascular diseases, as it possesses anti-inflammatory and antiarrhythmic properties
- A 5% use of chia seed in bread products has been approved by European Commission
- Chia oil, too, is used after extraction; there are three different methods to extract the oil
 - **Seed compression:** The seeds are stored at a low temperature of 4 °C in the dark and are processed with a cold pressing technique. Screw press is then performed at 25 °C-30 °C using electrical resistance heating
 - **Solvent method using n-Hexane favors** the functional characteristics of the oil, such as water absorption and holding capacity, and emulsifying stability

APPLICATIONS

- Seed sprouts
- Beverages
- Dairy products
- Bakery products
- Salads

ADVANTAGES

- Clinical evidence for weight loss and triglyceride reduction
- Helps treat diabetes
- Chia seeds can be stored for long periods

DISADVANTAGES

- Chia seeds may increase medication effect to lower blood pressure

Quinoa– Technology Introduction

Quinoa is gluten-free, contains all nine essential amino acids, and is high in protein content

INTRODUCTION

- **Quinoa** is a grain crop from the amaranth family; there are three main types of quinoa: white, red, and black
- Quinoa is gluten-free, contains all **nine essential amino acids**, and is high in protein content
- Quinoa has a **low glycemic index of 53, beneficial for blood sugar control.**
- The year 2013 was declared as "The International Year of Quinoa" by the United Nations (UN) due to its high nutrient value and potential to contribute to food security worldwide, thereby increasing its popularity
- **Nutrient content per cup: Protein:** 8g, **Fiber:** 5g, **Manganese:** 58% of the RDA, **Magnesium:** 30% of the RDA, **Phosphorus:** 28% of the RDA, **Folate:** 19% of the RDA, **Copper:** 18% of the RDA, **Iron:** 15% of the RDA

MATERIALS/SOLUTIONS & PLAYERS INVOLVED






RECENT DEVELOPMENTS

- Keen One Quinoa [launches](#) Thai Coconut Curry Quinoa Cups, which are certified organic
- Oatly along with Bolivian scientists have [developed](#) Quiny, which is a quinoa based powder that can be utilized in plant-based milks.

TECHNICAL INFORMATION

- White quinoa seeds are the most widely-available commercially
- **Processing** involves **washing, wherein seeds are rinsed in water and washed, then dried.**
- Washing is essential to remove saponins from the seeds
- **The outer covering of the seeds (saponins) are also removed by mechanical methods** such as with a rice polisher or by a machine similar to those used to remove wheat bran
- **Quinoa flakes are prepared by steam-rolling** the whole grain kernel
- **Quinoa is also consumed as sprouts, puffs, chips,** and as part of other processed foods

APPLICATIONS

- Salads
- Bakery products
- Processed foods
- Cooking – Quinoa flour

ADVANTAGES

- Contains all **nine essential amino acids** required by the human body
- Quinoa has a **low glycemic index,** making it good for blood sugar control

DISADVANTAGES

- **Natural coating of saponins** on quinoa seeds can cause stomach irritation

Cacao Beans – Technology Introduction

Apart from improving gut health cacao beans can help in improving cardiovascular health and glucose metabolism

INTRODUCTION

- **Cacao**, well known for providing cocoa, cocoa butter, and chocolate, is **native to Central and South America**
- Raw cacao powder contains **protein, calcium, carotene, thiamin, riboflavin, magnesium, sulfur, flavonoids, antioxidants, and essential fatty acids**
- Health benefits attributed include several beneficial effects on **cardiovascular health, such as lowering of blood pressure, improving vascular function and glucose metabolism**, and reducing platelet aggregation and adhesion, along with lowered LDL cholesterol and reduced cancer risks
- **Nutrient content per ounce: Total fat: 2.5g, Saturated Fat: 1.5g, Sodium: 20mg, Carbohydrates: 19g, Fiber: 7g, Protein: 5g, Iron: 16%, Calcium: 4%**

MATERIALS/SOLUTIONS & PLAYERS INVOLVED




RECENT DEVELOPMENTS

- **Nestlé has launched** a cacao fruit chocolate in Japan, by utilizing a method of producing chocolate made entirely from the cocoa fruit.
- **Laird superfood launched** hot chocolate with functional mushrooms, cacao powder, cinnamon powders and coconut milk.

TECHNICAL INFORMATION

- The cocoa beans collected are initially **cleaned to remove all extraneous materials**
- They are then **roasted to bring out the chocolate flavor and color**. The time, temperature, and degree of moisture depends on the type of beans used and the product or chocolate required from the process
- The **shells are removed** using a winnowing machine to leave cocoa nibs as the end products; cocoa nibs are **alkalized with potassium carbonate** to develop flavor and color
- The cocoa nibs are then milled to create cocoa liquor (cocoa particles suspended in cocoa butter), which is further pressed to extract the cocoa butter, leaving a solid mass called cocoa presscake
- The **cocoa butter is used to manufacture chocolate and the cocoa presscake** is then pulverized to form cocoa powder
- Normal **cocoa powder is chemically processed and roasted**, which destroys a large amount of the antioxidants and flavanols

APPLICATIONS

- Processed foods
- Beverages
- Bakery products
- Dairy products

ADVANTAGES

- The theobromine found in raw cacao can **treat depression**
- High amount of **calcium, carotene, and flavonoids; antioxidants can lower LDL cholesterol and improve heart function**

DISADVANTAGES

- Caffeine in cocoa, if consumed in large amounts, can **worsen diarrhea** and anxiety disorders.

Cereals and grains – Technology Introduction

Study's show that consumption of cereals and fibers help in improving digestive health

INTRODUCTION

- Cereals are high in fiber content and are mostly consumed in breakfast. They are **good sources of vitamins, minerals, antioxidants, and phytoestrogens**. Cereals are mostly consumed in breakfast due its high nutrient content levels
- Studies suggests that consumption of cereals in breakfast is also associated with lower BMI (body mass index) in children and adults. It has also been found that breakfast cereal consumption is also associated with diets that are lower in fat

APPLICATION

- Bakery products
- Cooking
- Beverages
- Dairy products
- Salads

Cereals and grains and their respective nutrient content

SUPERFOOD	NUTRIENT CONTENT
Barley	Fat, Fiber, Manganese , Selenium, Copper, Vitamin B1, Phosphorus, Magnesium
Teff	Protein, Fat, Fiber, Sodium, Carbohydrates, Thiamine, Vitamin B6, Niacin
Farro	Fiber, Protein, Fat, Niacin, Magnesium, Iron, Thiamine
Oats	Protein, Fiber, Fat, Omega-3, Omega-6
Barley	Fat, Fiber, Manganese , Selenium, Copper, Vitamin B1, Phosphorus, Magnesium

TECHNOLOGY TREND

- Cereals and grains are widely consumed as breakfast cereals rich in nutrients and low in fats.
- A few startups have also introduced beverages and bakery products derived from different cereals and grains

MATERIALS/SOLUTIONS & PLAYERS INVOLVED



Product: Chocolate Break Wafers
Category: Chocolate Confectionery
Company: Atkins International, UK



Product: Teff Waffle & Pancake Mix
Category: Baking Ingredients & Mixes
Company: Lovegrass, USA



Product: Organic Sliced Bread Mixes
Category: Baking Ingredients & Mixes
Company: Lovegrass, USA



Product: Walnut & Peanut Flavored Diet Shake
Category: Meal Replacements & Other Drinks
Company: Hanmi Natural Nutrition, South Korea



Product: Chocolate Caramel Flavored Meal Bars
Category: Snack/Cereal/Energy Bars
Company: Kellogg's, Kuwait



Product: Cocoa Granola
Category: Breakfast Cereals
Company: Empresas Carozzi – ECSA, Chile

*Source: Mintel, Company Website

Oats – Technology Introduction

Oats are rich in beta-glucan, a soluble fibre, that can also help to lower cholesterol re-absorption

INTRODUCTION

- Oats are whole-grain cereal **native to North America and Europe**.
- They are a good source of **beta-glucan, vitamins, minerals, fiber, and antioxidants**
- Whole oats contain a unique group of antioxidants called avenanthramides which are known to prevent heart disease
- Oats also have attributed **health benefits that include lowering of blood sugar and cholesterol levels, boosting immune system**. This has been linked to the beta-glucan content in oats
- **Nutrient content per 100g: Protein: 16.9g, Fiber: 6.9g, Fat: 6.9g, Carbs: 66.3g, Omega-3: 0.11g, Omega-6: 2.42g**

MATERIALS/SOLUTIONS & PLAYERS INVOLVED



TECHNICAL INFORMATION

- Raw oats undergo initial processes of **cleaning and hulling**, which remove unwanted materials.
- The groats are further processed to make an edible food product. **Lighter hulls are blown off by passing them through another set of aspirators**
- A **conditioning process** is then performed by heating to a **temperature of 215 °F**. The process gives a roasted, nutty flavor to the product and the moisture level is reduced, making it suitable for storage
- The conditioning process is then followed by **sizing, where the width graders are used to size the individual pieces**. Small groats are passed to cutting systems while the large groats enter the groat system. A steelcut cutting system is used to cut large as well as small groats
- The **pieces then go through a flaking process in which the raw material pieces are passed through the flaking mill to produce quick (minute oats, three-minute oats) and thick quick oats**, while baby steel cut produces baby flakes

APPLICATIONS

- Bakery products
- Processed food
- Dairy products

RECENT DEVELOPMENTS

- **Danone** has **launched** oat milk yogurts under its **So Delicious brand in Walmart**. The product has four flavors: Triple Berry, Spiced Pear & Fig, Strawberry Rhubarb and Sweet Mango and will be retailed at a price of \$1.89

Note: *'For more details, please check "Q3_2019-Pulse-MH" >>>*

ADVANTAGES

- Oats are **rich in beta-glucan**, that can help to lower cholesterol re-absorption
- It is also rich in magnesium, potassium, zinc, copper, manganese, selenium, and pantothenic acid

DISADVANTAGES

- Oats **not chewed properly** can cause **serious health issues**

Barley – Technology Introduction

Barley is used in the production of vinegar, malt extract, milk-type beverages, and breakfast food

INTRODUCTION

- Barley is a major cereal grain grown globally; it is **rich in fiber, antioxidants, and vitamins, such as B3 niacin, vitamin B1 thiamine, and minerals such as selenium, copper, chromium, phosphorus, magnesium, and niacin**
- The nutrition from barley has been attributed to maintaining good heart health, **protection against diabetes, lowering cholesterol and high blood pressure, and other risk factors associated with heart disease**
- Studies have linked high consumption of barley beta gluten to significant weight reduction, due to decreased hunger levels
- Nutrient content per cup: Fat: 1g, Fiber: 10g, Manganese : 1mg, Selenium: 23mg, Copper: 0.3mg, Vitamin B1: 0.4mg, Phosphorus: 162 mg, Magnesium: 80 mg**

MATERIALS/SOLUTIONS & PLAYERS INVOLVED



RECENT DEVELOPMENTS

- Waitrose has **launched** "Love you Gut" range. The Carrot, Apple and Turmeric Soup, is a blend of carrot apple, coconut milk and cider vinegar and the Multigrain Soup is a blend of chickpeas, millet, pearly barley and lentils in a tomato sauce.

TECHNICAL INFORMATION

- Barley is used in the production of vinegar, malt extract, milk-type beverages, and breakfast food.
- Milling of barley is performed to make blocked barley, pearl barley, barley groats, barley flakes, and barley flour for human consumption. The milling processes includes:
 - Cleaning & conditioning:** Barley is cleaned; moisture adjusted to 15% by drying/damping and resting.
 - Bleaching** in moisture and sulphur dioxide for about 20-30 minutes, followed by binning for up to 24 hrs.
 - Aspiration** to remove grit
 - Polishing:** Barley is polished with polishing machines with stones made of hard, white sandstone.
 - Steam cooking and flaking:** Barley flakes are made by steaming and flaking on large-diameter smooth rolls
 - Drying:** Flakes are dried to about 10.5% moisture to ready for packaging

APPLICATIONS

- Bakery products
- Cooking – Barley flour
- Beverages
- Salads
- Processed food

ADVANTAGES

- Barley consists of **eight essential amino acids** and high amounts of soluble fiber

DISADVANTAGES

- Some people who are sensitive to cereal grains such as wheat, oat, corn, and rice may have an **allergic reaction** after consuming barley
- The presence of **gluten** in barley can make **celiac disease worse**

Teff – Technology Introduction

Teff has high fiber content and can help in losing body weight faster. Startups like Happy tummy Co are utilizing teff in their flagship product

INTRODUCTION

- Teff is an ancient cereal **native to Ethiopia**, where it is mostly used to make injera, a traditional fermented pancake. It is also used as animal feed in other countries such as Australia, South Africa, and United States
- Teff is a good source of **complex carbohydrates, which make up 80% of the teff grain, and a total starch content of about 73%**
- Teff has high concentrations of **lysine**, a major limiting amino acid along with higher contents of **isoleucine, leucine, valine, tyrosine, threonine, methionine, phenylalanine, arginine, alanine, and histidine**, and high levels of fiber and minerals such as iron, zinc, calcium, and copper
- Nutrient content per cup: Protein: 10g, Fat: 1.6g, Fiber: 7g, Sodium: 20mg, Carbohydrates: 50g, Thiamine: 0.48mg, Vitamin B6: 0.24mg, Niacin: 2.3mg**

MATERIALS/SOLUTIONS & PLAYERS INVOLVED



RECENT DEVELOPMENTS

- Lovegrass Ethiopia** has won a silver and bronze award in the Free From Food Awards for being 100% teff based pasta.
- Love Grain**, a company based in San Francisco, introduced a line of gluten-free pancake mixes made from teff.

TECHNICAL INFORMATION

- Teff can be milled with the help of a **home milling machine** available in the market. A special adapter is provided to mill teff in an electric flour mill
- The milled **teff flour can then be readily used for cooking or can be stored in an airtight container** kept in a cool and dry place or refrigerated

APPLICATIONS

- Bakery products
- Processed food
- Cooking – Teff flour

ADVANTAGES

- The high fiber content in teff can help in **losing body weight fast**
- High content of **phosphorus** can reduce inflammation, bloating, cramping, and muscle pain associated with menstruation

DISADVANTAGES

- High consumption of teff can cause **bloating and gas**
- Teff also contains high amounts of **phytate**, which inhibits mineral absorption in humans

Whole plant – Technology Introduction

Whole plants such as moringa, hemp, broccoli, and asparagus are the trending superfoods

INTRODUCTION

- Superfood can be derived from entire plants in different types/varieties. **Green foods have the highest concentrations of easily digestible nutrients, vitamins, and minerals** to protect and heal the body, and fat burning compounds. Green superfoods contain proteins, protective photo-chemicals, and healthy bacteria helping build muscles and tissues
- **Plant superfood are also rich in chlorophyll, enhancing the green color of the superfood**

APPLICATION

- Cooking
- Bakery products
- Beverages
- Processed foods
- Dairy products

Whole plant and their respective nutrient content

SUPERFOOD	NUTRIENT CONTENT
Moringa	Protein, Vitamin B1, Vitamin B2, Vitamin B3, Vitamin C, Vitamin E, Calcium
Hemp	Fatty acids, Vitamin E, 20 amino acids, Protein
Broccoli	Vitamin K, Vitamin C, Chromium, Folate, Fiber, Pantothenic acid
Asparagus	Protein, Folacin, Vitamin K, Vitamin C, Vitamin B1, Vitamin B6

TECHNOLOGY TREND

- Plant-based energy drinks have been introduced by startups indicating a new technology trend implemented in the field of whole plant-based superfoods

MATERIALS/SOLUTIONS & PLAYERS INVOLVED



Product: Organic All-in-One Smoothie Mix + Probiotics
Category: Meal Replacements & Other Drinks
Company: Terrafertil, Colombia



Product: Defence Super Smoothie with Vitamins B6 & B12
Category: Juice Drinks
Company: Marks & Spencer, China



Product: Acai Berry Flavored Green Tea Drink with Guayusa and Moringa
Category: RTDs
Company: Importmova, Ecuador



Product: Moringa Infused Ceylon Black Tea with Herbs
Category: Hot Beverages
Company: Telon Tea, Ghana



Product: Carob, Raspberry and Chia Seeds Cereal Bars
Category: Snack/Cereal/Energy Bars
Company: 9Brand Foods, France



Product: Fancy Granola with Hemp & Cacao
Category: Breakfast Cereals
Company: Farmer Jo, Singapore

*Source: Mintel, Company Website

Moringa – Technology Introduction

Moringa products are targeting indications such as blood pressure and blood sugar levels apart from gut health

INTRODUCTION AND FEATURES

- Moringa leaves are stored by drying and freezing techniques
- According to a study, '**Moringa oleifera: A review on nutritive importance and its medicinal application**', the boiling technique performed on moringa leaves and seeds results in reduced cyanide, oxalate, and phytate content which can reduce the bioavailability of certain nutrients and processing if present

RECENT DEVELOPMENTS

- Kuli Kuli** raised \$5 million in a Series B round co-led by **Griffith Foods** and **eighteen94 capital**, other investors included InvestEco, S2G Ventures, Authentic Ventures, ViCap Investments, Rocana Venture Partners, Portfolia, Astia Angels, Next Wave Impact, and Golden Seeds, investment will be used by the company to launch its moringa ingredient arm while continuing to scale its moringa powder, bars and shots business
- South Africa-based **Moringa Wellness** is bringing its Moringa "miracle tree" line to RonnieColemanNutrition.com

PLAYERS INVOLVED



MORINGA LEAF CO.



Sunfood SUPERFOODS



APPLICATIONS

- Beverages
- Processed foods

RELEVANT PRODUCTS



Product: Moringa & Peppermint Tea

Company: Dennree, Germany

Features: The organic spice and herbal tea mix combines the refreshing boost of peppermint with a light moringa flavour, and is claimed to provide nutrients while detoxifying the body

Ingredients: peppermint, moringa

Claims: Functional digestive



Product: Energy Probiotic Wellness Shot

Company: So Good Brand, USA

Features: Contains organic, cold-pressed, raw and USDA Organic certified product contains one billion probiotic CFUs

Ingredients: Organic orange juice, organic spinach juice, organic mango juice, coffeeberry whole coffee fruit extract, Bacillus coagulans GBI-30 6086, organic moringa powder

Claims: Contain probiotics



Product: Spinach Burger with Moringa

Company: Proteinsa, Ecuador

Features: Contains 100% vegetal protein, features 8g of protein, is an exceptional source of antioxidants, medium in fat and salt, low in sugar and free from gluten and saturated fats

Ingredients: spinach, water, rice, potato starch, cassava starch, vegetable fat, oats, basil, vegetable oil, onion, broad bean, garlic, broccoli, gelling agent, salt, celery, flavor enhancer, spices, sugar, preservative substance, ferric pyrophosphate, moringa

Claims: Gluten-free

*Source: Mintel, Company Website

Matcha – Technology Introduction

Regular consumption of matcha tea along with get health improvement, reduces risk of heart disease by 31%

INTRODUCTION

- **Matcha** is tea variety that grows from the **Camellia sinensis** plant, a native to southwestern China
- Animal studies concluded the benefits of matcha tea include decreasing the risks of both kidney and liver damage and also reduction of blood sugar and triglyceride levels
- A **high amount of catechins** in matcha, e.g. epigallocatechin gallate (EGCG), are known to fight inflammation and repair cells
- Studies have suggested that regular consumption of matcha tea reduces risk of heart disease by 31%
- **Nutrient content per cup of matcha tea: Caffeine: 35 mg, Antioxidants, Vitamin A, Vitamin C, Iron, Fiber**

MATERIALS/SOLUTIONS & PLAYERS INVOLVED



RECENT DEVELOPMENTS

- Z Natural Foods (US) has **launched** organic matcha green tea latte powder which is dairy-free and vegan. The product is packed with antioxidants and MCT's (medium-chain triglycerides) and is cost-effective.

TECHNICAL INFORMATION

- Matcha is **cultivated by covering the tea plants 20-30 days** before harvest in order to avoid direct sunlight. This supports **increase in chlorophyll production**, boosting the amino acid content and also dark green color in the leaves
- After leaves are harvested, the stems and veins are removed and the leaves are ground into the fine powder known as "matcha."
- According to a study, compared to **placebo, matcha caused improvements in attention, reaction time, and memory**, suggesting improvement in cognitive performance
 - Another study showed that consumption of 2 grams of green tea powder daily for two months improved cognitive function in elderly people
- In one study, it was found that **matcha tea extract decreased tumor size** and slowed the growth of breast cancer cells in rats

APPLICATIONS

- Beverages
- Culinary preparations

ADVANTAGES

- Supports **weight loss**
- Helps in **digestion**
- May decrease the risks of kidney and liver damage
- May reduce risk of heart disease

DISADVANTAGES

- Some people can be allergic to matcha
- Due to its caffeine content, matcha may trigger certain side effects such as headache, insomnia, irritability, diarrhea, and heartburn

Hemp – Technology Introduction

Hemp is rich in essential fatty acids and products manufactured using hemp are considered as allergen-free

INTRODUCTION

- Hemp plants are **harvested for their fibers, seeds, oils, and meal**, which finds its application in industrial use
- Hemp plants are **capable of tolerating a variety of growing difficulties such as pest attacks, disease, and environmental conditions**
- Food products derived from hemp seeds are considered allergy-free, compared to many other products. Seeds are a **rich source of essential amino acids**. Major producers of hemp seeds include Canada, France, and China
- The U.S. government has prohibited cultivation of hemp because of its farming threat and safety issues

TECHNICAL ASPECTS

- Rich in **essential fatty acids**
- Studies have shown that consumption of hemp aid in the healing process of diseases related to immune deficiency

RECENT DEVELOPMENTS

- Bell Flavors & Fragrances** unveiled range of hemp flavors and botanical extracts. The botanical hemp extracts provide a profile beneficial for **sweet and savory foods** including bakery products, confectionary, ketchup, and beverages.
- Hudson News Distributors** collaborated with hemp-derived product manufacturer **Docklight Brands** for CBD-based product distribution

APPLICATIONS

- Bakery products
- Salads
- Cooking – Hemp flour
- Dietary supplements

MATERIALS/SOLUTIONS & PLAYERS INVOLVED



LANDISH

RELEVANT PRODUCTS



Product: Carob, Raspberry and Chia Seeds Cereal Bars
Category: Snack/Cereal/Energy Bars
Company: 9Brand Foods



Product: Fancy Granola Hemp & Cacao
Category: Breakfast Cereals
Company: Farmer Jo



Product: Lemon Balm & Valerian CBD Hemp Tea
Category: Hot Beverages
Company: PK Benelux

Fermented Foods – Technology Introduction

Fermentation is used for producing foods with extended shelf life and desired organoleptic properties. It has applications in Dairy products, Beverages, Desserts, Confectionary . Fermented products improve gut health

INTRODUCTION

- Fermentation has been traditionally used for **producing foods with extended shelf life** and desired organoleptic properties
- Fermentation involves conversion of carbohydrates to form carbon-dioxide, organic acids, alcohol, and other byproducts through action of microorganisms. These compounds have a preservative effect on the food. **Lactobacillaceae** is the most used microorganism

APPLICATION

- Dairy products
- Beverages
- Desserts
- Confectionary
- Bakery products

Different sources of Fermented Foods and their respective Medical Applications

SOURCE	TYPES	MEDICAL APPLICATIONS
Dairy	Cheese, YOGURT, tofu, kefir	<ul style="list-style-type: none"> • Helps in bowel trouble and treating diarrhea • Prevent ulcers
Beverage	Kombucha, herbal tea, fermented soda and juice, alcoholic drinks	<ul style="list-style-type: none"> • Improves digestion • Helps in weight loss and body detoxification
Bakery products	Bread, crackers, cookies	<ul style="list-style-type: none"> • Sourdough breads improves glucose tolerance
Others	Sauerkraut, pickles, chocolate, kimchi	<ul style="list-style-type: none"> • Kimchi is rich in antioxidants, which help digestion • Sauerkraut helps immune system fight infection

TECHNOLOGY TRENDS

- One key factor that has led to introduction and adoption of traditional fermented foods is widespread presence of **expatriate populations** (particularly Asian) and their demands for familiar food products
- Such foods include the **Korean kimchi, doenjang and gochujang, kombucha**, Asian Yogurts and fermented dairy products, fermented products including sauerkraut, cheese, etc.
- The market of fermented foods is further driven by rising demands for healthier products and changes in dietary patterns among the general population. Perception of the concepts of digestive wellness has also driven this segment
- Fermented foods are **primarily dominated by fermented drinks like kefirs, kombucha**, and YOGURTs; most of these are products of lacto-fermentation
- New product development is primarily being carried out by adopting traditional recipes and adding familiar components; fermented teas along lines of kombucha are being developed with popular flavors such as blueberry, raspberry, ginger, etc.
- Similarly YOGURTs similar to traditional kefirs are among new product launches in the fermented food segment.
- Europe, along with Asia, also has had a tradition of including fermented food in diet, is seen as the key geography that will drive growth in fermented foods/drinks
- **Veganz**, a Czech brand sells a tempeh coconut curry while French manufacturer Sojami markets flavoured, lacto-fermented, tempeh-like soy that is eaten like a spreadable, vegan cheese
- Foods such as **kwass**, a **traditional east European beverage** made from beetroot fermentation, and sourdough breads, have just begun to be explored for commercial opportunities

Koji, Kombucha and Kimchi – Technology Introduction

The market of fermented foods is driven by rising demands for healthier products and changes in dietary patterns among the general population. Perception of the concepts of digestive wellness has also driven this segment

INTRODUCTION

- Types: Kombucha, Kefir, Kimchi, Koji
- Fermented foods **support gut health by adding beneficial bacteria to the diet**. Many trending fermented foods originate from Europe and Asia, leading to higher acceptance in these populations
- France has been the leading country in product launches carrying such claims in the past year
- **Kombucha tea and kefirs are among the leading product trends. Koji fermented soybeans produces isoflavone compounds effective against cancer. Kimchi is claimed to help in obesity prevention and kombucha is known to have antioxidant properties**

TECHNICAL ASPECTS

- **Kefir** a cultured, fermented beverage that tastes a great deal like a yogurt drink. It's made using "starter" grains or 'kefir grains'
- **Koji** (*Aspergillus oryzae*) fungus has been traditionally used in China and Japan for fermentation. Koji is mixed with cooked rice, potatoes, soybeans and placed in a warm and humid environment for about 50 hours
- **Kombucha is a beverage similar to cider**. It is produced by fermenting sweetened tea by a combination of bacteria and yeast called SCOBY (symbiotic colony of bacteria and yeast)
- **Kimchi is produced by fermenting vegetables and lactic acid bacteria** for any specific period of time. Baechu cabbage is the most preferred vegetable used in combination with other ingredients to enhance taste and texture of kimchi

RECENT DEVELOPMENTS

- **Soulfresh launched Bootleg Booch in Australia**, which is organic alcoholic kombucha and is low sugar and preservative-free.
- **Aqua ViTea launched Pineapple Lemonade Kombucha**, It is organic, pasteurized and contains natural probiotics.
- **Dr. Hops Kombucha Beer expanded** distribution of its all-natural, high-alcohol kombucha beer products to the entire state of California

APPLICATIONS

- Beverages
- Foods

MATERIALS/SOLUTIONS & PLAYERS INVOLVED

FOOD MANUFACTURERS



Soulfresh



Lifeway

WILD TONIC



THE ORGANIC CO. BREW DR KOMBUCHA

THE GUTS BY CAPTAIN COMPANY

HEALTH-ADE KOMBUCHA



BUCHA BREW

Kombucha – Technology Introduction

Kombucha are the most trending fermented food as it comes in wide varieties primarily alcoholic and non alcoholic

INTRODUCTION

- Kombucha is the **most popular fermented drink** as it contains **less than 0.5% ABV** content and has additional health benefits
- Kombucha is made by **fermentation of black or green tea extract**, with sugar and SCOBY culture (symbiotic colony of bacteria and yeast)
- The Fermentation process **goes on for 7-14 days** and polyphenols are converted to organic acids, vitamins which help to boost metabolism and improve digestion
- Kombucha beverage is a source of bioactive components, such as **polyphenols and glucuronic acid**. The beneficial outcomes of kombucha consumption are attributed to the synergistic effect between these components, making it a drink with potential beneficial health properties

RECENT DEVELOPMENTS

- **Coca-Cola's venture arm** First Beverage Group made an equity [investment](#) of \$20 million in **Health-Ade kombucha**
- **Bucha Brew kombucha** [expanded](#) in Canada by increasing its distribution from 300 to 1100 stores. The company was found in 2015 and it produces a wide range of kombucha and promote transparency and sustainability. The company is among the fastest growing brands in Canada.
- **Kombucha Brewers International** [hires](#) EAS consulting group to review Standard of Identity for kombucha

PLAYERS INVOLVED



APPLICATIONS

- Sodas
- RTD's
- Juices
- Snacks
- Dairy

RESEARCH

Journal: [Microorganism](#)

Title: Efficacy of Kombucha Obtained from Green, Oolong, and Black Teas on Inhibition of Pathogenic Bacteria, Antioxidation, and Toxicity on Colorectal Cancer Cell Line

Overview

The pH values of the kombucha tea were found to be in a range of 2.70-2.94 at 15 days of fermentation. The lowest pH value of 2.70 was recorded in the kombucha prepared from black tea. The total acidity of kombucha prepared from black tea was the highest by 16.75 g/L and it was still maintained after heat treatment by boiling and after autoclaved. Six organic acids: glucuronic, gluconic, D-saccharic acid 1,4-lactone, ascorbic, acetic, and succinic acid in kombucha tea were detected by HPLC with the optimization for organic acids detection using isocratic elution buffer with C18 conventional column. The highest level of organic acid was gluconic acid. Kombucha prepared from green tea revealed the highest phenolic content and antioxidation against DPPH radicals by 1.248 and 2.642 mg gallic acid/mL kombucha, respectively. Kombucha prepared from green tea and black tea demonstrated toxicity on Caco-2 colorectal cancer cells. Therefore, kombucha tea could be considered as a potential source of the antioxidation, inhibition of pathogenic enteric bacteria, and toxicity on colorectal cancer cells.

Authors

Kaewkod T, Bovonsombut S, and Tragoolpua Y

Note: 'For more details, please check "Q2_2019-Pulse-MH" >>>

Kefir – Technology Introduction

Kefir products are increasing in the market and established players like Danone are also entering this domain due to high consumer demand

INTRODUCTION

- Kefir is a **cultured, fermented beverage** that tastes a great deal like a yogurt drink. It's made using "starter" grains or 'kefir grains'
- The kefir grains **consist of a symbiotic culture of lactic acid bacteria** and yeasts embedded in a matrix of proteins, lipids, and polysaccharides. A complex and highly variable community can be found in these grains, which can include lactic acid bacteria, acetic acid bacteria, and yeasts
- **Kefir is fermented for a period of 12-24 hours** at a temperature of 20–25 °C and then grains are strained from the milk using a corrosion-resistant utensil.
- Kefir is **nutrient-dense**, with plenty of protein, B vitamins, potassium, and calcium

RECENT DEVELOPMENTS

- **Lifeway Foods**, has **debuted** kefir minis and plantful kids pouches Natural Products Expo East 2019. The products will have flavors include Campfire S'mores and Strawberry Split
- **Love Your Guts** has **debuted** fermented foods and Water Kefir and Kombucha. Kefir contains live crystal cultures, organic sugar and fruits. It contains probiotics, digestive enzymes, amino acids, vitamins and minerals.
- **Good Culture** has **launched** new wellness probiotic gut shots. It is a combination of 50 billion live and active cultures of probiotics along with kefir and ingredients like turmeric, matcha, chaga, and collagen.

PLAYERS INVOLVED



APPLICATIONS

- Beverages
- Dairy
- Bakery
- Cereals

RELEVANT PRODUCTS

Journal: [Journal of Dairy Science](#)

Title: Physicochemical features and microbial community of milk kefir using a potential probiotic *Saccharomyces cerevisiae* KU200284

Overview:

The study analyzed the β-glucan contents, physicochemical features, and microbial communities in milk kefir prepared using *Saccharomyces cerevisiae* KU200284 isolated from cucumber jangajji, a fermented vegetable commonly eaten in Korean. Three types of milk kefir were manufactured, with (1) activated kefir grain, (2) activated kefir grain with commercial *S. cerevisiae* BOF, and (3) activated kefir grain with *S. cerevisiae* KU200284. β-Glucan contents of milk kefir using kefir grain and kefir grain with *S. cerevisiae* strains BOF. The pH, titratable acidity, viscosity, Brix level, and alcohol contents of milk kefir using kefir grain with *S. cerevisiae* strains were acceptable compared with milk kefir using only kefir grain. The internal transcribed sequence (ITS) rRNA reads in tested milk kefir showed representative strains of *Kluyveromyces marxianus* (>52% relative abundance) and *Saccharomyces cerevisiae* (>16% relative abundance). In contrast, milk kefir using *S. cerevisiae* strains had higher relative abundance of *S. cerevisiae* (>37%). It could be used in functional dairy products as a starter culture.

Authors

Hong JY, Lee NK, Yi SH, Hong SP, and Paik HD

Botanical Extracts – Technology Introduction

Botanical extracts contain some key ingredients such as essential oils and resins, phenols and terpenoids. Botanical extracts have many health benefits. These are widely used in nutraceutical applications

INTRODUCTION

- Botanical extracts **are natural extracts derived from herbs, leaves, spices and other such sources**, containing some key ingredients such as essential oils and resins, phenols and terpenoids. They are **available in powder or liquid forms to be used in foods, beverages and pharmaceutical industry**
- Sensient has recently launched a **new range of botanical extracts named All Natural Flavor Collections** consisting of five categories: Floral, Herbs, Spices, Tea, and Ginger. It is aimed to suffice the growing consumer demands of healthier and natural food ingredients

APPLICATION

- Dairy
- Non-dairy beverages
- Baked goods
- Dietary supplements
- Cereals
- Meat products

Different sources of Botanical Extracts and their respective Health Claims

SOURCE	TYPES	HEALTH BENEFIT
Spices	Cinnamon, pepper, clove, cumin, cardamom	<ul style="list-style-type: none"> Cardamom helps fight inflammation and plays a key role in preventing cancer cell growth Weight loss
Herbs	Honey bush, lemongrass, mint	<ul style="list-style-type: none"> Strengthens immune system Maintains cholesterol levels Lowers blood sugar
Others	Tea leaves, grape, ginkgo	<ul style="list-style-type: none"> Green tea leaf extract is effective in cancer prevention Lowers cholesterol

TECHNOLOGY TRENDS

- The **functional food trend has pushed manufacturers to incorporate functionality into their products**, but limitations of raw materials and their ability to be used in all food types persist
- Extracts help overcome these limitations while also providing a concentrated form of the active component** with possibly more efficacy
- Botanical extract have been used widely in nutraceutical applications**, but their inclusion in functional food recipes provide a wide range of options for product development
- Food manufacturers **either use soft extract or strong infusions botanical extract for their products**
- Soft extract are **highly concentrated extracts consisting of minimum 70% plant material**. The extraction solvent is completely removed during the concentration process. These **extracts are added to foods and beverages to increase concentrations of active compounds**
- Strong Infusions are diluted form of soft extract. They are **rich in aroma and serve as ideal flavoring compounds**. They are used in soft drinks and other beverages
- Dohler GmbH produces botanical extracts combined with additional **nutrients such as biotin, vitamin B12, B1, B6, calcium and niacin**. These ingredients can be used to make a health claim approved by European Health Claims Regulation
- Technical aspects are important in this aspect as processing and extraction steps must ensure that active components are not destroyed or lost

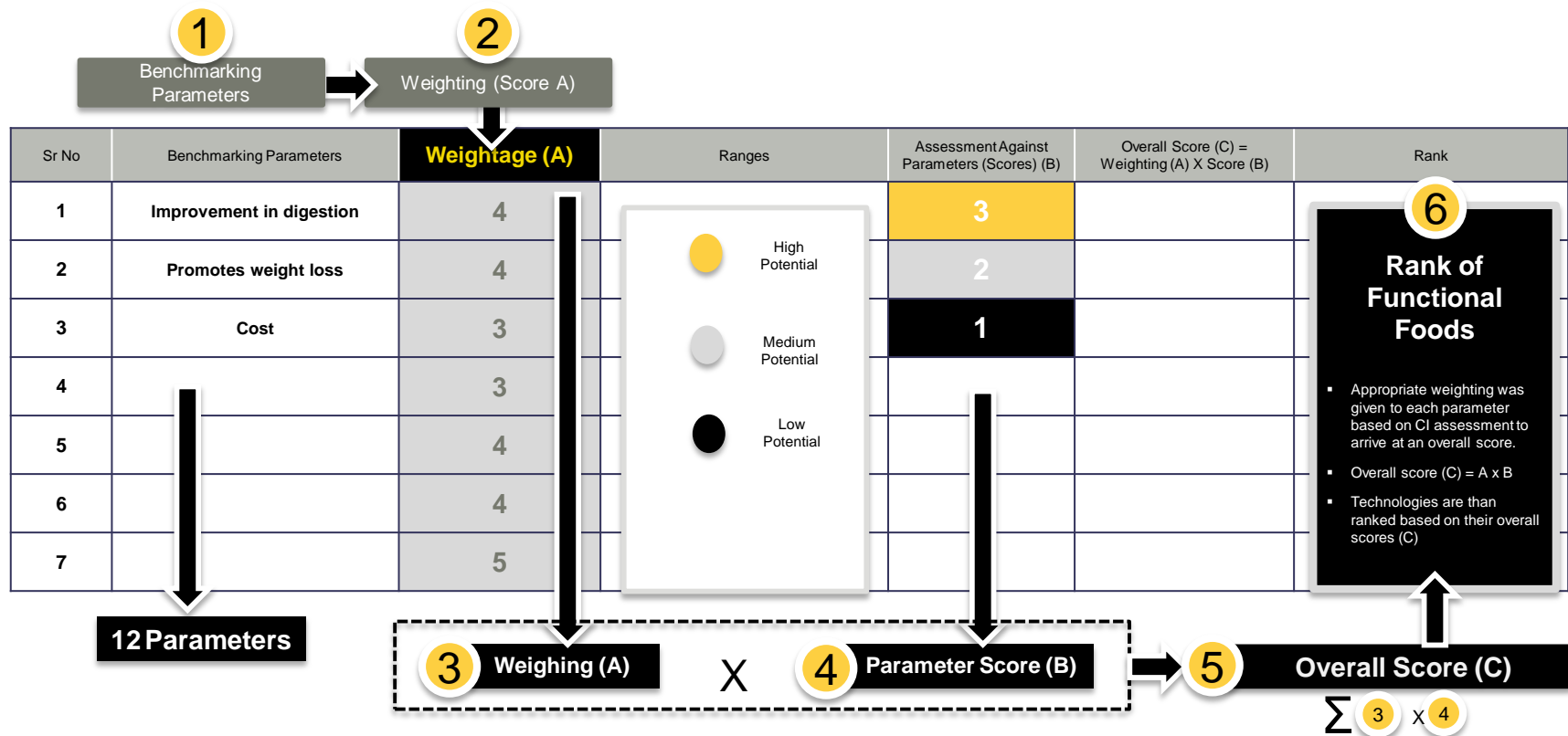
04

BENCHMARKING

Identification of the most trending segments in the domain of Functional Foods for Metabolic Health



Benchmarking Methodology



Functional Foods Benchmarking Jul 2019 – Dec 2019

Weightage (A)															Scoring & Ranking	
Parameters		5	5	5	4	4	3	3	3	2	3	4	3	5	Score	Rank
		No of Product Launches	No of Patent activity	No. of Research activity	Industry Development	Claims to Promote Weight Loss	Claims to Reduce Irritable Bowel Syndrome	Applicability	Technology Maturity	Source Availability	Ease in Recovery	Shelf-life	Regulatory Aspects	Consumer Acceptability		
Ingredients	3	>400	High	High	High	High	High	High	High	High	Easy	High	Less regulated	High		
	2	200-400	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Increasing regulations	Moderate		
	1	50-200	Low	Low	Low	Low	Low	Low	Low	Low	Difficult	Low	Highly regulated	Low		
Probiotics		>400	High	High	High	Moderate	Moderate	High	High	High	Moderate	Moderate	Highly regulated	High	127	1
Superfoods		>400	Moderate	Moderate	High	Moderate	High	High	Moderate	High	Moderate	Moderate	Increasing regulations	High	120	2
Fermented foods		50-200	Moderate	Moderate	High	Moderate	Low	Moderate	Moderate	Moderate	Moderate	High	Highly regulated	High	100	3
Prebiotics		200-400	Low	Moderate	Moderate	High	Low	High	Moderate	Moderate	Difficult	Low	Highly regulated	Moderate	87	4
Botanical Extracts		50-200	Low	Low	Low	Low	Moderate	Low	Low	Moderate	Moderate	Moderate	Less regulated	Low	67	5



Score B 3-2-1

05

ACTIVE PLAYERS

Players activities in Functional Foods for Metabolic Health domain.



Prenexus Health is focusing on sustainable environmental practices to manufacturer XOS prebiotic from sugarcane

PRENEXUS HEALTH

- **Prenexus Health** produces prebiotic ingredients, that are focused to **improve digestive health** and metabolism.
- The company produces AmpliVida XOS (Xylooligosaccharide) ingredient. It will be marketed and sold in **partnership** with **DSM**
- The company operates through **Gilbert, Arizona**. The location provides **benefits** of being **closest to the vertically-integrated supply chain**, along with **access to labor**
- The company has a patent process for XOS production: **Patent Number- US20150307952A1**
"Liquid co-extraction process for production of sucrose, xylo-oligosaccharides and xylose from feedstock"

Player Type	Ingredient Manufacturer
Area of Specialisation	Prebiotic Ingredients
Business Segment (list that is related to trend)	Supplements and Vitamins
HQ Country	United States
Website	http://www.prenexushealth.com/
Business Entity Type	Private
Founded	2015
No. of employees	11-50

Focus Area

Probiotics

Prebiotics

Superfoods

Botanical Extract

Fermented Foods

PRODUCT LIST

- **AmpliVida XOS (Not Commercialized)** - It can be used in range of food applications such as bars, ready-to-eat cereals, and functional beverages

PRODUCTS & TECHNOLOGIES

- AmpliVida XOS is a 5 carbon sugar linked by unique bonds with a high degree of polymerization ranging from 2-12.
- and is **obtained from Non-GMO sugarcane** via gentle water extraction. It is selectively targeted by beneficial bacteria in gut without promoting the growth of unfriendly bacteria.
- It can be taken as an **effective dosage of up to 2.4 grams** per day.

PRODUCT CHARACTERISTICS:

- Organic
- Non-GMO
- Made from high fiber sugarcane
- No chemicals

ADVANTAGES:

- Made from sugarcane and is GRAS certified
- Clean label alternative

FUTUREBRIDGE VIEWPOINT

Prenexus Health is expanding its market in metabolic health by partnering with established players such as DSM, this strategy provides the company an opportunity to utilize the distribution and marketing capabilities of DSM to promote its pipeline product. The company also has a mission to promote healthy products by using sustainable environment practices

ACTIVITIES (Last two quarters)



Investors



Developments

- 2019: Prenexus Health **receives** GRAS for XOS prebiotic



Competitors



STARTUP

SMALL AND MID-SIZED PLAYER

ESTABLISHED PLAYER

Rowdy Mermaid Kombucha has shifted to aluminium packaging to promote their products and to make them more cost-efficient



ROWDY MERMAID KOMBUCHA

- Rowdy Mermaid Kombucha produces a kombucha drinks using natural, fresh ingredients in small scalable batches. All products are made from ethically-sourced wildcrafted plants and small farm Bangladeshi teas
- The company is based in Colorado. Its products are currently available at nearly 1,000 retail stores throughout the Central and Western United States. It includes partners Whole Foods, Natural Grocers, King Soopers and Walmart.
- The company has shifted from glass bottles to cans to reduce environmental impact, increase portability and offer a lower shelf-price

Player Type	End-product manufacturer
Area of Specialisation	Fermented Foods
Business Segment (list that is related to trend)	Kombucha
HQ Country	United States
Website	http://www.rowdymermaid.com/
Business Entity Type	Sole Proprietorship
Founded	2013
No. of employees	11-50

Focus Area

Probiotics

Prebiotics

Superfoods

Botanical Extract

Fermented Foods

PRODUCT LIST

- Lion's Root
- Alpine Lavender
- Flower Grow
- Living Ginger
- Rowdy Belly
- Savory Peach
- Strawberry Tonic



PRODUCTS & TECHNOLOGIES

- The product contains ingredients like Brewed Tea (Filtered Water, Organic Green Tea, Organic Black Tea), Organic Cane Sugar, Live Cultures and different plants for flavors.
- The nutrition content in each can is- **Calories: 45, Total Fat, 0g, Sodium 0mg, Sugars: 9g, Protein: 0g**

PRODUCT CHARACTERISTICS:

- Vegan
- Non-GMO
- Organic
- Gluten-free

ADVANTAGES:

- Low in alcohol, contains functional botanicals and roots
- Recyclable packaging

FUTUREBRIDGE VIEWPOINT

The company is expanding its production capacity to scale up production. It is backed up by large investors, which provides opportunity for enhancement of product portfolio. They has recently shifted to glass bottles to aluminum cans to increase profits, be cost-efficient and to increase sustainability.

ACTIVITIES (Last two quarters)

Investors

- KarpReilly
- Justin Gold
- Brendan Synnott

Developments

- 2019:** Rowdy Mermaid expands into larger Boulder headquarter to increase distribution.
- 2019:** Rowdy mermaid kombucha announces national retail availability of its new aluminum cans

Competitors



Zbiotic's product helps to improve ability to digest alcohol byproducts and it naturally boosts digestion

ZBIOTICS

ZBIOTICS

- ZBiotics produces genetically engineered probiotics, that can help to breakdown acetaldehyde, which is a byproduct of alcohol
- The company is based in **California** and it was found by Stephen Lamb and Zachary Abbott and it aims to use genetic engineering for betterment of human life and is building products that can help the body handle everyday chemicals in alcohol and dairy to serious contaminants like radiation and lead

Focus Area

Probiotics

Prebiotics

Superfoods

Botanical Extract

Fermented Foods

PRODUCT LIST

- [Zbiotics](#) - Enhanced Probiotic Drink contains water, *B. subtilis* ZB183 probiotic



PRODUCTS & TECHNOLOGIES

- The product uses genetic engineering to create a probiotic that can **enhance the microbiome's ability to break down acetaldehyde**
- They use homologous recombination transfer the trait from constitutive and healthy acetaldehyde breakdown into a precise desired spot on the bacterial chromosome to form ZB183 – a probiotic strain of *B. subtilis*

PRODUCT CHARACTERISTICS:

- No sugar
- Vegan
- Natural flavor
- Recyclable

ADVANTAGES:

- Natural flavor and is recyclable
- Cures hangover

FUTUREBRIDGE VIEWPOINT

The company has a mission to launch healthier products for betterment of human health by making use of genetic engineering. They are aiming to launch new products that can deal with chemicals present in dairy and help to fight against contaminations

ACTIVITIES (Last two quarters)

Investors

- Y Combinator
- Kevin Moore
- Social Capital
- Babel Ventures

Developments

- 2019: ZBiotics [launches](#) probiotic shot to boost alcohol digestion

Competitors



STARTUP

SMALL AND MID-SIZED PLAYER

ESTABLISHED PLAYER

Player Type	End-product manufacturer
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Area of Specialisation	Beverage
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Business Segment (list that is related to trend)	Probiotics
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HQ Country	United States
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Website	https://zbiotics.com/
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Business Entity Type	Private
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Founded	2016
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No. of employees	2-10
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Better Booch is planning to expand its business across globe by boosting its direct to consumer sales business



BETTER BOOCH

- Better Booch produces 100% raw, non-alcoholic kombucha drinks that contains probiotics and its not pasteurized
- The company is based in California and was found by Trey Lockerbie and Ashleigh Lockerbie
- The company utilizes fruits, spices and herbs, adaptogens, antioxidants in its products to add nutrients and provide health benefits

Focus Area

Probiotics

Prebiotics

Superfoods

Botanical Extract

Fermented Foods

PRODUCT LIST

- Golden Pear
- Citrus Sunrise
- Ginger Boost
- Morning Glory
- Cherry Retreat
- Rose Bliss
- Hola Horchata



PRODUCTS & TECHNOLOGIES

- The product contains ingredients like kombucha tea made of sugar, water, black tea and it **contains yeast and bacterial cultures**.
- Different flavors have ingredients like orange peel, sage, tulsi, turmeric, ginger, lemongrass etc. which provides functional benefits

PRODUCT CHARACTERISTICS:

- Non-GMO and Gluten-free
- Organic
- Locally sourced
- Vegan and Kosher

ADVANTAGES:

- Natural flavors and low sugar
- Recyclable packaging

FUTUREBRIDGE VIEWPOINT

The company currently sells its product via retail chains in Southern California, Northern California, Arizona, Nevada and parts of the Midwest and has recently gained an investment of \$2.5 million and is looking to expand in Colorado and increase its distribution, and will be launching a direct-to-consumer online business.

ACTIVITIES (Last two quarters)

Investors

- Crush Ventures

Developments

- 2019: Better Booch, kombucha maker raises \$2.5 million in latest round

Competitors



STARTUP

SMALL AND MID-SIZED PLAYER

ESTABLISHED PLAYER

Player Type	End-product manufacturer
Area of Specialisation	Fermented Foods
Business Segment (list that is related to trend)	Kombucha
HQ Country	United States
Website	http://www.betterbooch.com/
Business Entity Type	Private
Founded	2011
No. of employees	11-50

Cove Kombucha produces low sugar kombucha, with organic ingredients to promote health, sustainability and transparency

COVE KOMBUCHA

- Cove kombucha produces a kombucha drinks using fresh, ethically sourced and organic loose leaf tea. The teas are fermented for over a month
- The company is based in Nova Scotia. It was found by Ryan and John Maclellan and the company aims to promote sustainability and is producing healthy kombucha that can be beneficial for all
- The products are available across various retail locations across Canada, including large retailers such as Whole Foods Market, Costco Wholesale and Sobeyes

Focus Area

Probiotics

Prebiotics

Superfoods

Botanical Extract

Fermented Foods

PRODUCT LIST

- Orange Ginger
- Blueberry Pomegranate
- Mango Turmeric
- Raspberry Lemonade



PRODUCTS & TECHNOLOGIES

- The product contains ingredients like **raw kombucha made from cane sugar, black tea, green tea and live cultures**. It also contains organic juices like ginger, orange, blueberry and turmeric, etc.

PRODUCT CHARACTERISTICS:

- Not pasteurized
- Non-GMO
- Canadian organic certified
- Low in sugar

ADVANTAGES:

- Less in calories
- Promotes sustainable packaging

FUTUREBRIDGE VIEWPOINT

The company has recently gained investment, the funds vindicates Cove's strategy for regional development and expansion. The company is planning to launch a CBD-infused variety in Canada. Its products are currently available at major retailers in Canada. These strategies will enable the company to expand its market in North American region

ACTIVITIES (Last two quarters)

Investors

- Canaccord Genuity Wealth Management

Developments

- 2019: Cove kombucha has **raised** \$1.2 million in its latest funding round led by Canaccord Genuity Wealth Management, which is a Vancouver-based investment bank.

Competitors

STARTUP

SMALL AND MID-SIZED PLAYER

ESTABLISHED PLAYER

Player Type	End-product manufacturer
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Area of Specialisation	Fermented Foods
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Business Segment (list that is related to trend)	Kombucha
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HQ Country	Canada
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Website	http://www.covekombucha.com
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Business Entity Type	Private
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Founded	2016
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No. of employees	11-50
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Synbiotic Health will launch its first product in 2020, and the product is targeted for nutrition supplements as well as food and beverage



SYNBIOTIC HEALTH

- Synbiotic Health is nutritional ingredients company and it develops synergistic synbiotics that provide health benefits, which are proven and demonstrated through clinical studies
- The company has [collaborated](#) with multiple universities and companies like Food for Health Center & Department Of Food Science and Technology, University of Nebraska; UAS Labs and Prenexus Health
- The company has also [published](#) a research paper "An In Vitro Enrichment Strategy for Formulating Synergistic Synbiotics."

Focus Area

Probiotics

Prebiotics

Superfoods

Botanical Extract

Fermented Foods

PRODUCT LIST

- Synergistic Synbiotics (Pipeline)

PRODUCTS & TECHNOLOGIES

- Synergistic Synbiotic ingredients developed by Synbiotic Health, is part of "iVE Synbiotics" combinations.
- The product has proven benefits (invitro analysis), it supports the growth of probiotic bacteria in the gut. The company will further publish Human clinical results in 2020. The first product, targeting food & beverage and nutritional supplement manufacturers, will launch in late 2020.

PRODUCT CHARACTERISTICS:

- Contains both probiotics and prebiotics
- Great functional performance

ADVANTAGES:

- Advanced Synbiotics that provide complete nutrition
- Benefits are proven by invitro analysis

FUTUREBRIDGE VIEWPOINT

Synbiotic Health is aiming to formulate products where probiotic microbe can be enriched and stimulated by the paired prebiotic substrate. The company has also signed a commercial agreement with NUtech Ventures, which will provide Synbiotic Health exclusive rights for use of specially developed strains in synbiotic products.

ACTIVITIES (Last two quarters)

Investors

- NUtech Ventures

Developments

- 2019: Synbiotic Health [partners](#) with NUtech Ventures
- 2019: Synbiotic Health [opens](#) a lab at University of Nebraska's Lincoln campus

Competitors

progenity **SeedHealth**

Player Type	Ingredient manufacturer
Area of Specialisation	Synbiotics
Business Segment (list that is related to trend)	Nutritional ingredients
HQ Country	United States
Website	http://synbiotichealth.com/
Business Entity Type	Private
Founded	2019
No. of employees	1-10

STARTUP

SMALL AND MID-SIZED PLAYER

ESTABLISHED PLAYER

Seed Health takes microbe-systems approach with strain-specific benefits that help to improve digestive health, cardiovascular health as well as dermatological health

SeedHealth®

SEED HEALTH

- Seed Health is a microbial sciences company that develops live biotherapeutics, which utilizes bacteria to influence human and environmental health
- Seed Health's founder company is LUCA Biologics, which is a biotechnology company developing living medicines targeting reproductive and urogenital health
- The company had a multiple strain specific clinical studies to prove benefits like [gastrointestinal health](#), [gut barrier integrity](#), [dermatological health](#), [cardiovascular health](#), [gut immune function](#) and [micronutrient synthesis](#)
- The company has probiotic strains bank in Italy, Denmark, United Kingdom, France and US. The strains are unique to Seed and not found in yoghurt, fermented foods, or 'probiotic' beverages

Player Type **Ingredient manufacturer**

Area of Specialisation **Synbiotics**

Business Segment (list that is related to trend) **Supplements**

HQ Country **United States**

Website **<https://seedhealth.com/>**

Business Entity Type **Private**

Founded **2016**

No. of employees **11-50**

Focus Area

Probiotics

Prebiotics

Superfoods

Botanical Extract

Fermented Foods

PRODUCT LIST

- Daily Synbiotic



PRODUCTS & TECHNOLOGIES

- They utilize **Simulator of the Human Intestinal Microbial Ecosystem (SHIME)**, flow cytometry, genome sequencing, screening platform to ensure specific strains survive and remain viable in transit through digestion with no synthetic or chemical coating.
- It takes microbe-systems approach **with strain-specific benefits beyond digestive health**, including cardiovascular health, dermatological health, immune function, reproductive health, gut barrier integrity, and oxidative stress. The formulation is the first probiotic on the market to increase folate production.
- The product has **18 month shelf-stability**, and no refrigeration is required 26°C / 79°F.

ADVANTAGES:

- Other functional benefits along with digestive health
- All benefits are verified by more than 20 strain-specific, peer-reviewed, double-blind published studies

FUTUREBRIDGE VIEWPOINT

Seed Health has collaborated with academic institutes. The company is trying to prove the efficacy of its product and is increasingly putting efforts on clinical trials to further its products. Daily synbiotic is an innovative product that utilizes unique algae delivery system to ensure survival of strains.

ACTIVITIES (Last two quarters)

Investors

- Founders Fund
- Greycroft Ventures
- BOLD Capital
- 8VC
- The Chernin Group
- Box Group
- Cross Culture Ventures

Developments

- 2019:** Seed Health [partners](#) with Atmo Biosciences to utilize Atmo's Gas Capsule technology for clinical studies on their flagship probiotic, the Daily Synbiotic

Competitors



Seed Health proprietary product daily synbiotic provide multiple benefit and has a 2 in one capsule to provide resistance to stomach acid



Probiotic Inner Capsule

Proprietary formulation comprised of clinically-studied strains characterized at academic institutions and research partners in Italy, Spain, Belgium, US, and Japan. Not of animal or soil origin. Biofermented in Europe and free of all 14 allergen classes under the European Food Safety Authority (EFSA).

Prebiotic Outer Capsule

Punicalagins isolated and purified from Indian pomegranate—these are biotransformed by gut microbes into powerful metabolites for human health. Concentrated phenolic compounds from wild-harvested organic Scandinavian chaga and pine bark.

2-in-1 capsule technology resistant to stomach acid, digestive enzymes, and bile salts.

Protect against stomach acid and safeguard viability through digestion. Chlorophyllin exterior shields from light, while liquid prebiotic suspension is an additional barrier to oxygen, moisture, and heat (which bacteria are sensitive to).

Digestive Health / Gastrointestinal Immunity / Gut Barrier Integrity Probiotic Blend

- *Bifidobacterium longum* SD-BB536-JP
- *Bifidobacterium breve* SD-BR3-IT
- *Lactobacillus plantarum* SD-LP1-IT
- *Lactobacillus rhamnosus* SD-LR6-IT
- *Lactobacillus rhamnosus* HRVD113-US
- *Bifidobacterium infantis* SD-M63-JP
- *Bifidobacterium lactis* SD-BS5-IT
- *Lactobacillus crispatus* SD-LCR01-IT
- *Bifidobacterium lactis* SD-150-BE
- *Lactobacillus casei* HRVD300-US
- *Bifidobacterium breve* HRVD521-US
- *Bifidobacterium lactis* HRVD524-US
- *Bifidobacterium longum* HRVD90b-US
- *Lactobacillus rhamnosus* SD-GG-BE
- *Lactobacillus reuteri* SD-RD830-FR
- *Lactobacillus fermentum* SD-LF8-IT

Product claims

- Vegan
- Gluten-free
- Allergen-free
- Preservative-free

Functions

- Helps in maintaining gut barrier function and integrity
- Supports digestive health (to maintain regularity, ease bloating, and can alleviate occasional constipation).
- Supports improved immunological responses in the gastrointestinal tract.
- Helps to maintain blood cholesterol levels.
- Does not require refrigeration, probiotic strains are stable at ambient temperature (up to 79° F)

STARTUP

SMALL AND MID-SIZED PLAYER

ESTABLISHED PLAYER

Evolve BioSystems is an innovative startup that utilizes bifidobacteria to improve gut health and digestion



EVOLVE BIOSYSTEM

- Evolve BioSystems, Inc. dedicated to developing the next generation of products to establish, restore, and maintain a healthy human gut microbiome.
- Evolve BioSystems has partnered with multiple universities to prove the efficacy of its probiotic strain that can be utilized in infant probiotic products



- Evolve BioSystems develops rationally designed microbiome-based products containing B.infantis to treat dysbiosis in human and animal.

Player Type **Ingredient manufacturer**

Area of Specialisation **Supplements**

Business Segment (list that is related to trend) **Probiotics**

HQ Country **United States**

Website **www.evolvebiosystems.com**

Business Entity Type **Private**

Founded **2011**

No. of employees **10-50**

Focus Area

Probiotics

Prebiotics

Superfoods

Botanical Extract

Fermented Foods

PRODUCT LIST

- [Evivo](#) (for human health)
- [GlycoGuard](#) (for animal health)

PRODUCTS & TECHNOLOGIES

- Evivo which is specific to infants, it works in synergy with human breast milk. It is clinically proven to reduce gut pH, inhibit the growth of pathogenic bacteria.
- Evivo is the first and only probiotic powder containing B. infantis
- It is mixed with breast milk and fed to babies to restore their gut microbiome

PRODUCT CHARACTERISTICS:

- No artificial colors or dyes
- No artificial flavors
- No preservatives
- Gluten free

ADVANTAGES:

- Inhibit pathogenic bacteria
- Solves infant gut dysbiosis

FUTUREBRIDGE VIEWPOINT

The company has partnered with multiple universities and institutes for proving efficiency of its probiotic product, they have also filled 13 patents to commercialize its novel product and technology. To expand the reach and adoption of Evivo, company will drive scale in messaging directly to consumers and health care practitioners nationwide.

ACTIVITIES

Investors

- Bill Gates Foundation
- Horizons Ventures
- Li Ka Shing Foundation
- Arla Foods
- Continental Grain Company
- Johnson & Johnson Innovation
- Tate & Lye Ventures

Developments

- 2019: Reckitt Benckiser Group (UK) has [partnered](#) with Evolve BioSystems (US) for sales of Evivo.

Competitors

CHR HANSEN

MicroBiome therapeutics

STARTUP

SMALL AND MID-SIZED PLAYER

ESTABLISHED PLAYER

Evolve BioSystems has patented probiotic varieties, compounds based on microorganisms for infant health as well as delivery techniques of probiotics



PATENT SNAPSHOT

STARTUP

SMALL AND MID-SIZED PLAYER

ESTABLISHED PLAYER

Patent Number

[WO2019136186A2](#)[WO2019143871A1](#)[WO2019055718A1](#)[WO2019055717A1](#)

Innovation Type

Methods for monitoring the health of the mammalian gut

Composition and a method for preparing a stable, activated and dormant form of commensal bacteria such

Composition to provide renewable source of key metabolites which can be utilized in gut programming

Composition to facilitate growth of gut bacteria

Title

Method for determining dysbiosis in the intestinal microbiome

Activation of conditionally-expressed oligosaccharide pathways during fermentation of probiotic strains

Metabolomic revision of mammalian infants

Oligosaccharide compositions and their use during transitional phases of the mammalian gut microbiome

Earliest Publication

2019

2019

2018

2018

Description

The inventions described herein relate generally to the methods for monitoring the health of the mammalian gut by checking for whether dysbiotic parameters exceed a threshold level or not. In particular, this invention is directed to the use of parameters which correlate with the level of bifidobacteria, especially *Bifidobacterium longum* subsp. *infantis* in the mammalian colon.

This invention relates generally to methods and compositions to achieve and maintain a desirable in vivo phenotype during fermentation and processing of food products for human or animal consumption. The methods and compositions of this invention require an activator that acts as a metabolic trigger for Mammalian Milk Oligosaccharide (MMO) consumption phenotype without necessarily requiring oligosaccharides (i.e a sugar polymer of 3 or more monosaccharides) within the fermentation medium.

The inventions described herein relate generally to the use of compositions to increase output of particular metabolites in the gut of a nursing infant mammal including humans. These compositions generally comprise one or more bacterial strains selected for their growth on mammalian milk oligosaccharides, a source of mammalian milk oligosaccharides, and, optionally, nutritive components required for the growth of that infant mammal.

This invention provides compositions of oligosaccharides, their preparation, and their use to facilitate the growth of certain beneficial gut bacteria over other gut bacteria in a mammal in order to prevent gastrointestinal distress associated with a major change in gut microflora, such as that which occurs when an infant is weaned from its mother's milk to alternative food sources, or during the recovery of the gut microbiome after a course of oral antibiotics, hospitalization, therapy such as chemotherapy or radiation treatments, or conditions where a deficiency in dietary fiber is observed.

Koia is a plant based beverage maker and the company is collaborating with retailers to boost up sales



KOIA

- Koia produces 100% plant Protein based beverage products which contains prebiotic elements
- The company was found by Dustin Baker, Christopher Hunter and Maya French
- It helps in **improving gut health and boosts immunity**
- The company has raised a total of \$7.5M in funding over 2 rounds

Focus Area

Probiotics

Prebiotics

Superfoods

Botanical Extract

Fermented Foods

PRODUCT LIST

- **Koia Fruit Infusions** :Mango Crème, Strawberry Crème, Chocolate Banana
- **Koia Protein drinks** : Cinnamon Horchata, Vanilla Bean, Coconut Almond, Cacao Bean, Cold Brew Coffee



PRODUCTS & TECHNOLOGIES

- The product contains **Chicory root fiber, Turmeric extract and has plant proteins blends such as brown rice, hemp, and pea blend** to support the body's metabolism. They also contain ingredients like cacao that aids digestion
- The products are free from soy, dairy, gluten, and GMO

PRODUCT CHARACTERISTICS:

- Soy-Free
- Dairy-Free
- Gluten-Free
- Non-GMO

ADVANTAGES:

- Contains superfoods that provide functional benefits
- Boosts gut health

FUTUREBRIDGE VIEWPOINT

The company is actively launching new products that are aiming to tap at new rising trends such as keto. Koia uses a proprietary protein blend of brown rice protein, pea protein, and chickpea protein in all its drinks along with chicory root fibre to add health benefits.

ACTIVITIES (Last two quarters)

Investors

- KarpReilly
- AccelFoods

Developments

- **2019**: Koia announces [launch](#) of coffee line at whole foods in January
- **2019** : Koia [launches](#) Koia Keto beverages in collaboration with Whole Foods Market

Competitors



STARTUP

SMALL AND MID-SIZED PLAYER

ESTABLISHED PLAYER

Player Type	End-product manufacturer
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Area of Specialisation	Beverage
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Business Segment (list that is related to trend)	Superfoods
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HQ Country	United states
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Website	https://drinkkoia.com/
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Business Entity Type	Private
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Founded	2014
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No. of employees	40-100
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Wild Tonic produces hard Jun kombucha that contains prebiotics, probiotics and has superfoods

WILD TONIC

- Wild Tonic (Good omen bottling LLC) produces Jun Kombucha in both alcoholic and non alcoholic category which is made from fermenting tea and honey and is natural and healthy.
- The kombucha contains both probiotics and prebiotics and it contains organic juices, botanicals, and herbs.
- The cobalt blue as color of its bottles of its bottle was inspired by bee conservation and company's effort to strengthen bee population.
- The company was found by Holly Lyman and Dale Kamarata
- The company has been recently awarded most innovative drink of the year award

Player Type **End-product manufacturer**

Area of Specialisation **Beverage**

Business Segment (list that is related to trend) **Fermented Foods**

HQ Country **United states**

Website **<http://www.wildtonic.com/>**

Business Entity Type **Private**

Founded **2015**

No. of employees **40-100**

Focus Area

PRODUCT LIST

- Blueberry Basil
- Blackberry Mint
- Cilantro Ginger Lime
- Mango Ginger
- Tropical Turmeric
- Raspberry Goji Rose



PRODUCTS & TECHNOLOGIES

- The company produces Jun kombucha made from **certified organic fruits, honey and botanical extracts** which are gluten free and contain both prebiotics and probiotics and it is non pasteurized to maintain the integrity of probiotics. It has low sugar and caffeine content
- The products come in different varieties such as non alcoholic, alcoholic (5.6 and 7.6% ABV)

PRODUCT CHARACTERISTICS

- Contains prebiotics and probiotics
- Contains natural flavor
- Non-GMO
- Amino acids

ADVANTAGES:

- Contains superfoods that provide functional benefits
- Have a wide range of flavors

FUTUREBRIDGE VIEWPOINT

The company has a vision that is dedicated to promoting sustainability by supporting farmers and partnering with beekeeping organizations to focus on bee conservation. The company is trying to increase its presence in retail locations and has partnered with retailers and debuted its products, this will help to increase its consumer base.

ACTIVITIES (Last two quarters)

Investors

- Not disclosed

Developments

- **2019** : Wild Tonic Kombucha partnered with Nackard Bottling Co in order to expand distribution classic jun kombucha throughout Northern Arizona.
- **2019**: Wild Tonic debuted canned version of its alcoholic hard kombucha at Birds of Prey

Competitors



STARTUP

SMALL AND MID-SIZED PLAYER

ESTABLISHED PLAYER

Good Culture produces probiotics and superfoods containing organic cheese and sour cream products



GOOD CULTURE

- Good Culture is a producer of cream cheese, sour cream, and cottage cheese in different varieties
- The products are organic and infused with superfoods.
- The company prepares cheese and sour cream products with USDA certified organic and Keto certified labeling. The milk is obtained from cows not treated with rBST (recombinant Bovine somatotropin) and is pasteurized

Focus Area

Probiotics

Prebiotics

Superfoods

Botanical Extract

Fermented Foods

PRODUCT LIST

- Organic cottage cheese: whole milk, low-fat organic, low fat
- Organic cottage cheese: pineapple, strawberry chia, blueberry acai chia, strawberry, blueberry, peach
- Double cream classic
- Simply sour cream



PRODUCTS & TECHNOLOGIES

- Good culture's organic cottage cheese contains **different types of milk utilized such as low-fat and whole milk**. The products also include superfood infused products
- All the product ranges contain active cultures

PRODUCT CHARACTERISTICS:

- USDA organic certified
- Keto Certified
- Contains superfoods
- No added hormones

ADVANTAGES:

- Made from simple ingredients and real protein
- Is free-from chemical preservatives, gums, and thickeners

FUTUREBRIDGE VIEWPOINT

The produces functionally beneficial products infused with superfoods and probiotics. It has also received funding in 2019 to expand its distribution and increase the global presence. Claims such as USDA organic and Keto Certified help to make the product more popular amongst health-conscious population.

ACTIVITIES (Last two quarters)

Investors

- CAVU Venture Partners
- Almanac Insights
- 301 INC

Developments

- 2019: Good Culture (US) **launched** superfood-infused Wellness Probiotic Gut Shots, which are claimed to support cognitive, bone, immunity and digestive health.

Competitors



STARTUP

SMALL AND MID-SIZED PLAYER

ESTABLISHED PLAYER

Player Type **End-product manufacturer**

Area of Specialisation **Dairy Products**

Business Segment (list that is related to trend) **Probiotics**

HQ Country **United states**

Website **<https://www.goodculture.com/>**

Business Entity Type **Private**

Founded **2014**

No. of employees **11 - 50**

GoodBelly probiotics is NextFood's brand and the company produces probiotic-based products like juices, yogurts, shots, and supplements



GOODBELLY PROBIOTICS

- GoodBelly Probiotics is NextFood's brand and the company produces probiotic products such as juices, shots, beverages, bars, supplements and cereals
- The company operates through its headquarter in Colorado. It was founded by Todd Beckman and Steve Demos with the aim to improve human nutrition with nutritious functional foods while adhering to socially responsible environmental practices
- The company [partnered](#) with General Mills in 2017 in order to expand into new products, such as bars, cereals etc.

Focus Area

Probiotics

Prebiotics

Superfoods

Botanical Extract

Fermented Foods

PRODUCT LIST

- **Juice Drink:** No Added Sugar Orange, Mango, Strawberry Banana, Tropical Green etc.
- **Shots:** Straight Shot, Plus Shot and Functional Shot
- **Yogurt:** Black Cherry, Coconut, Strawberry, Peach etc.
- **Water Beverages & Bubbles:** Orange Pineapple Basil, Lemon Lime
- **Protein Shakes:** Green Power, Tropical Coconut and Triple Berry
- **Bars:** Cocoa Peanut Butter and Honey Almond Butter
- **Supplement:** Probiotic supplement and Probiotic+Iron supplement
- **Cereals:** Peanut Butter Crunch Cereal

PRODUCTS & TECHNOLOGIES

- The products contain strains of *Lactobacillus plantarum 299V* (LP299V) and *Bifidobacterium lactis BB12*.
- These strains have ability to survive the stomach's harsh acidic environment, balances digestive microflora, and promotes healthy gut and metabolism.

PRODUCT CHARACTERISTICS:

- Vegan
- Non-GMO
- Kosher
- Soy-free and Gluten-free

ADVANTAGES:

- Contain live and active cultures to support digestion
- Sustainably practices

FUTUREBRIDGE VIEWPOINT

GoodBelly probiotics is expanding its market in metabolic health by partnering with established players such as General Mills. This provides an opportunity to expand the distribution, innovate products and to venture into new categories. The company also has a mission to produce next generation functional foods while following responsible capitalism.

ACTIVITIES (Last two quarters)

Collaborators



Developments

- 2019: General Mills and GoodBelly [launch](#) cereal and lactose-free yogurt range.
- 2019: Cereal Partners Worldwide [launches](#) GoodBelly's breakfast cereal in the UK

Competitors



Player Type	End-product manufacturer
Area of Specialisation	Probiotic products
Business Segment (list that is related to trend)	Juices, shots, supplements and yogurts
HQ Country	United States
Website	https://goodbelly.com/
Business Entity Type	Private
Founded	2006
No. of employees	11-50

STARTUP

SMALL AND MID-SIZED PLAYER

ESTABLISHED PLAYER

PB2 Foods produces peanut powder which contains probiotics as well as prebiotics for providing functional benefits

PB2Foods

PB2 FOODS

- PB2 Foods produces peanut powders in a wide range of flavors and they utilize natural and simple ingredients and they contain probiotics and prebiotics
- The company is based in Tifton. It was found by J.C. Bell and they aim to produce inventive healthy products that are liked by consumers
- The company is on a mission to connect farmers to families, and inspire healthy, balanced living. The products are available at Walmart and is available at Amazon

Focus Area

Probiotics

Prebiotics

Superfoods

Botanical Extract

Fermented Foods

PRODUCT LIST

- Original PB2
- Cocoa PB2
- Vanilla PB2
- Organic PB2
- Pre + Probiotic PB2
- Almond PB2
- PB2 Performance Peanut Protein
- PB2 Performance Almond Protein



PRODUCTS & TECHNOLOGIES

- PB2 contains **6 g of plant-based protein** has no added sugar it has **90% less fat and 70% less calories** than other peanut butters.
- The product contains inulin and 1 billion CFUs of probiotic per serving. The probiotic used is *Bacillus coagulans*. The probiotic gets active once it reaches the right environment in a person's gut

PRODUCT CHARACTERISTICS:

- All natural
- Gluten-free
- Shelf-stable
- Kosher

ADVANTAGES:

- Shelf-stable and contains both probiotics and prebiotics
- Can be used in cooking, baking, and can be eaten as a powder

FUTUREBRIDGE VIEWPOINT

PB2 Foods is expanding into metabolic health domain. The company has recently launched new products in new locations at Walmart's nationwide and it will also be available on Amazon. They are looking to expand sustainable products which can be utilized by consumers to get functional benefits.

ACTIVITIES (Last two quarters)



Investors

- Not disclosed



Developments

- 2019: PB2 [launches](#) peanut powder with prebiotics and probiotics



Competitors



Player Type	End-product manufacturer
Area of Specialisation	Peanut Powder
Business Segment (list that is related to trend)	Probiotics and Prebiotics
HQ Country	United States
Website	http://www.pb2foods.com/
Business Entity Type	Private
Founded	2007
No. of employees	50-200

STARTUP

SMALL AND MID-SIZED PLAYER

ESTABLISHED PLAYER

DuPont is an established players that provides ingredient based and product based solution for improvement of metabolic health and digestion



DUPONT

- DuPont is **globally present in more than 70 countries**, offering solutions in safety, healthcare, nutrition, electronics, mobility and construction sector.
- Business Segment: Electronics & Imaging, Nutrition & Biosciences, Safety & Construction, and Transportation & Advanced Polymers.
- DuPont has 160 subsidiaries which includes Danisco Argentina S.A., Danisco Australia Pty Limited, Danisco Austria GmbH, Danisco Brasil Ltda., DuPont Nutrition Food Ingredients (Beijing) Co., Ltd., DuPont Nutrition Biosciences ApS, Danisco Sweeteners Oy, etc.

Focus Area

Probiotics

Prebiotics

Superfoods

Botanical Extract

Fermented Foods

PRODUCT LIST

- [Dietary Supplements](#)
- [Dairy Cultures](#)

PRODUCTS & TECHNOLOGIES

- DuPont offers dietary fibers ingredients, HMO's and probiotic ingredients, These ingredients that **promote problem-free digestion and reduce the risk of lifestyle health problems.**
- Litesse offers prebiotic functionality for additional digestive health benefits.
- CARE4U contains pre and probiotic ingredients.
- HOWARU has many varieties based on different probiotic strains which can benefit health.
- FloraFIT probiotics are Customizable stable proven.
- The company also produces Cheese Cultures, HOLDBAC Protective, Kefir-D Cultures Cultures, PROBAT Mesophilic Cultures and Yogurt Cultures.

ADVANTAGES:

- Natural and plant-based
- Shelf-stable products that aids digestion

FUTUREBRIDGE VIEWPOINT

DuPont offers cultures, enzymes, and supplements that improve metabolic health. The company has undertaken many strategic decisions like partnerships and mergers to excel in the field of microbiome, probiotics, and enzymatic cultures. This will further enable the company to expand its business.

ACTIVITIES (Last two quarters)

Agreements



Developments



- 2019: DuPont expands** its probiotics capacity with the construction of **probiotics fermentation unit** at its Rochester, New York
- 2019: DuPont launches** probiotic cultures designed for plant-based products

Competitors



Player Type	Ingredients and end-product manufacturer
Area of Specialisation	Food and beverage
Business Segment (list that is related to trend)	Probiotics, prebiotics and fermented foods
HQ Country	United States
Website	http://www.dupont.com/
Business Entity Type	Public
Founded	1802
No. of employees	10,001+

STARTUP

SMALL AND MID-SIZED PLAYER

ESTABLISHED PLAYER

Nestlé has undertaken many strategic partnerships in the past six months to advance in microbiome research to produce solutions for gut based disorders



NESTLÉ

- Nestlé is globally present in more than 190 countries and the company offers effective food and beverage solutions
- The company has more than 2000 brands to provide and its business segments include: food and beverages, health care nutrition, skin health and petcare.
- The company has more than 50 subsidiaries which includes Nestlé waters, Garato, Nespresso, Cereal Partners Worldwide, Svitch, Beverage Partners Worldwide, Sweet Leaf Tea Company, Nestlé Australia etc.

Focus Area

Probiotics

Prebiotics

Superfoods

Botanical Extract

Fermented Foods

PRODUCT LIST

- Beverages
- Milk Products and Nutrition
- Prepared Dishes and Cooking Aids
- Chocolates and Confectionery

PRODUCTS & TECHNOLOGIES

- Nestlé offers a **variety of breakfast cereals that contain superfoods, prebiotics and probiotics**, the brands include Cheerios, Fitness, Lion, Nesquik Cereal.
- The company also produces a variety of beverages that have added functional superfruits to provide better immunity.
- Nestlé is also partnering research institutes to further its reach in microbiome research to produce supplements that can treat gut disorder and metabolic diseases.

ADVANTAGES:

- Healthy products with label transparency

FUTUREBRIDGE VIEWPOINT

The company is undertaking strategic decisions like partnerships and it has partnered with CMI to build better understanding on microbiome's impact on human health in order to accelerate the development of nutritional solutions. They have also partnered with Caelus Health to develop food supplements based on specific microbiota to treat diabetes.

ACTIVITIES (Last two quarters)



Agreement



CAELUS
HEALTH



Developments

- 2019: Nestlé partners with Center for Microbiome Innovation (CMI) for microbiome research



Competitors



Player Type	End-product manufacturer
Area of Specialisation	Microbiome supplements
Business Segment (list that is related to trend)	-
HQ Country	Switzerland
Website	http://www.nestle.com/
Business Entity Type	Public
Founded	1866
No. of employees	10000+

Danone is a leading player in functional foods segments and the company provides multiple products that can aid digestion and metabolism



DANONE

- Danone is one of the major companies that provides dairy products, infant nutrition foods and is present in globally in over 120 countries
- The company has 20 plus brands and is focused to produce healthy food products.
- The company has more than 52 subsidiaries, which includes Nutricia, Danone Research B.V., Danone Turkey, Vega, White Wave Food, Happy Family etc.
- The company has launched different variations in yogurts, juice, sports beverages containing functional elements

Player Type	End-product manufacturer
Area of Specialisation	Food and Beverage
Business Segment (list that is related to trend)	Probiotics, prebiotics, superfoods and fermented foods
HQ Country	France
Website	http://www.danone.com/en/
Business Entity Type	Public
Founded	1919
No. of employees	10,001+

Focus Area

Probiotics

Prebiotics

Superfoods

Botanical Extract

Fermented Foods

PRODUCT LIST

- Dairy products
- Juice
- Sports drinks
- Baby food

PRODUCTS & TECHNOLOGIES

- Danone has **multiple brands that are focused on fermented foods, foods containing probiotics and superfoods**
- The brands produce yogurts, oatmilks containing active cultures of *L. casei*, *Bifidus*, *B.L. regularis*, *Bifidus actiregularis*



ADVANTAGES:

- Products contain blends of superfoods, probiotics and prebiotics and hence are beneficial for gut

FUTUREBRIDGE VIEWPOINT

The company is undertaking strategic decisions like partnerships and it has partnered with CMI to build better understanding on microbiome's impact on human health in order to accelerate the development of nutritional solutions. They have also partnered with Caelus Health to develop food supplements based on specific microbiota to treat diabetes.

ACTIVITIES (Last two quarters)

Agreement

- 2019: Danone [invests](#) in Forager Project
- 2019: Danone [leads](#) Epigamia's seed funding round

Developments

- 2019: Danone [launched](#) Okios caffeinated dairy beverage, which is rich in nutrients and proteins
- 2019: Danone [announced](#) that it will award a fellowship \$25,000 to graduate students for the gut microbiome, yogurt, and probiotics research.

Competitors



STARTUP

SMALL AND MID-SIZED PLAYER

ESTABLISHED PLAYER

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