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Global Nutritional

The nutritional marketplace, currently estimated at about 190 billion USD for global dietary supplements, is influenced by consumer pull and by business operator push like any other marketplace. Consumer pull is usually reflected in the whatever major health concerns are currently among the top five. Wise market observers will try to predict the movements in the marketplace by trying to predict which health concerns will dominate in the near future.

With the global obesity epidemic going strong and increasing, it is currently not hard to predict that morbidities associated with too much weight and abdominal fat will also increase, and that consumers, at least those aware of the problem, will try to adjust their diets to compensate. One of the most severe conditions resulting from obesity is diabetes, the incidence of which is currently rising alarmingly in Asian countries, and also in the Western industrialized nations, albeit at a more moderate pace.

Accordingly, foods with a low glycemic index are expected to become attractive in these markets – which is practically the global marketplace. This will increase market chances for sugar alternatives such as Stevia and will also encourage innovation with less known botanicals.

However, these new ingredients will first have to take the hurdle of safety evaluations in markets such as the EU, where a Novel Food authorization is required for all substances that do not have a history of safe food use in the EU before 15 May 1997.

And speaking of regulatory hurdles – Europe really is a special case within the global marketplace. During the past few years, our understanding about the importance of the food we eat for our health has received new input. As scientists investigate the many functions of the gut microbiome (and of other, related microbiomes like the oral mucosal one), it becomes more and more obvious that many non-communicable diseases may indeed be rooted in our diet.

The gut microbiome and its connection to the human central nervous system – the so-called gut-brain axis – is currently a hot topic for scientific investigation. Where before, the best known function of the gut microbiota was immune modulation (which in itself is a very important function), we can now make links to IBS, mood (including stress, anxiety, and depression), obesity, cognition, sleep, and even neuropsychological disorders like ADHD and autism, and neurodegenerative diseases such as Parkinson’s and Alzheimer’s.

It is not surprising, therefore, that probiotics and prebiotics are soaring globally. As more gut microbiome functions and more probiotic and prebiotic foods that can help support these functions are discovered, the upwards trend of products is expected to continue.

What’s baffling is the fact that Europe, where yoghurts and the knowledge of how good they are for you are part of traditional diets, is currently being left behind market-wise, due to the restrictive regulatory environment. Botanicals, in the same kind of bind in that they are prohibited from making health claims (excepting the so-called pending claims), can at least be the subject of “contains” claims and may be mentioned on product labels. Probiotics and prebiotics cannot even do that. The European Food Safety Authority (EFSA) considers the words “probiotic” and “prebiotic” to be health claims, and no health claims have been authorized for these ingredients. Therefore, mentioning these words is currently prohibited.

This de-facto censoring results in keeping valuable knowledge about their daily diet from consumers, and it is also affecting innovation and market growth in an important sector that is soaring everywhere else in the world. The benefits of probiotics are currently fueling the new category of personalized nutrition and are a crucial part of infant nutrition as well.

Meanwhile in the EU, regulatory constraints are forcing food business operators to seek out regulatory loopholes which will in all likelihood disappear soon, as is currently the case with the Medical Device loophole in the EU for substance-based products, which has become inaccessible for probiotics following a revision of the Medical Device Regulation, now (EU) 2017/745.

Same as with the botanical health claims, the problem with probiotic health claims lies in EFSA’s insistence on applying drug-like measuring sticks to food health effects. There is no “one substance – one effect” paradigm in biological matrices, let alone in living organisms like bacteria. Should EFSA solve this basic problem and actually start allowing botanical and probiotic health claims to go through, this would certainly change the landscape of the European nutritional market substantially and quickly.

This demonstrates the difficulties inherent in predicting market developments. Changing regulatory environments, more than consumer pull, will have a drastic impact on innovation and market growth. The future (and EFSA’s future approach to evaluating health claims) will tell whether the EU will catch up with the global nutritional marketplaces.

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Nutraceuticals Now is a technical review providing the latest information on functional products and ingredients which are defined as having a disease preventing and/or health promoting benefit in addition to their nutritional value. It is targeted at manufacturers of food and drink, who are producing finished products aimed at the ever increasingly health conscious consumer.

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With consumer awareness of functional nutrition higher than ever, and science and technology driving exciting new innovations, the future for nutraceuticals is looking bright.

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In a fast-moving consumer-led industry, the importance of marrying future trends with the latest scientific research has never been greater.

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Stricter regulation toppled the Vitafoods poll as the biggest challenge for businesses.

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EU Regulation

... stifling innovation for the gut microbiome sector

It is well-documented that innovation is crucial to maintaining competitiveness and inspiring growth. Regulation, needed to ensure a fair system for all involved, has the potential to positively or negatively influence such innovation. Within the food supplement sector, it can be argued that inefficient regulation is stifling innovation and growth, none more so than the impact of the Nutrition and Health Claims Regulation (NHCR) on the probiotic and consequent Microbiome sector.

The Gut Microbiome sector, the newest area of interest that has relationships with chronic disease and overall health is expected to have a CAGR of 17.05%, from 2017 – 2022. A significant area of the Gut Microbiome is that of probiotics. In the EU, Probiotics is one of the categories most negatively affected by the NHCR. While probiotics have a long history of use in many countries, the European Commission has in effect restricted the use of the term “probiotic” by including in 2007 guidance that the term is a health claim. As a consequence many Member States prohibit the use of the term on the basis that it could mislead the consumer. Fortunately, some Member States continue to permit the terms on the logical basis that if you prevent the use of the term, you are denying the consumer information on the main characteristic of the product.

To compete for health claim approval a company must run at least 3 randomised controlled tests with a minimum investment of €1.5 million. Even if a company has the financial resources to satisfy such requirements, based on previous statistics, the odds favour the likelihood of failure. To put this in perspective, from 121 Article 13.5 applications submitted, at an estimated cost of 60 million, just 6 were successful.

Over 400 applications have been submitted to EFSA but to date, with the exception of a generic claim on live yoghurt, not a single positive assessment for a probiotic claim has been granted.

The current situation sees an SME dominated sector struggling to reach the investment required to compete with the manufacturers’ point of view, the regulation does little to impact upon consumer interest in probiotics and its contribution to the growing field of interest, ‘The Microbiome’.

The Gut health mega-trend has seen a significant increase in Google searches from 2013 - 2018, Figure 1 below illustrates the growth in the number of searches from 2013 - 2018 and highlights how the term ‘gut health’ overtook ‘digestive health in late March 2017.

It is clear that consumers are searching for products and supplements containing probiotics, however, in the absence of scientific information in the form of claims, the consumer is forced to self-assess the efficacy of a product and make purchase decisions without access to meaningful information on product content. Consumers have a much better understanding of the term probiotic than that they do individual bacteria strains. As Figure 2 illustrates, compared to the most popular three strains of bacteria utilised in probiotics, they still pale in comparison to consumer searches for the term probiotic. The purpose of the health claims regulation was to prevent consumers from being exposed to misleading information. Its objective was not to prevent consumers having access to meaningful information on product content.

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Figure 1: Google Trend search - ‘Gut health’ versus ‘Digestive health’

Figure 2: Google Trend Search - ‘Probiotics’ versus Popular Bacteria Strains

EHPM is working to raise awareness of the current situation amongst key decision makers which includes a common industry statement calling for the Commission to take action. This was adopted in November 2017 at a workshop organized in the European Parliament to highlight how the current implementation of the NHCR is holding back innovation in the food sector unnecessarily. In the course of this event, EHPM provided a case study on the disastrous impact the NHCR is having on innovation in the probiotic sector. Ideally, the Commission will adjust its interpretation to resolve the issue as the current practice of using a guidance document adopted in 2007 with no legal effect to justify a policy approach that is clearly not working is not acceptable. Continuing down this route will have serious ramifications for the development of the probiotic industry and the future growth of the microbiome sector.
Considering Consumer Preference in Health Supplements

By Jessica Cao, Vice President, Global Nutritional Marketing, Catalent Pharma Solutions

The softgel capsule is a well-established and trusted means of delivering dietary supplements, and remains the dose form of choice for many consumers due to its rapid uptake and format, which is easier to swallow than a solid dose tablet. It is now rare to see products such as Omega-3 fish oil supplements formulated as a dose tablet. It is now rare to see products such as Omega-3 fish oil supplements formulated as a dose tablet. In considering the health supplements market, it is essential to understand the consumer preferences and dietary restrictions of the target population.

Chewable vitamins and other dietary supplements have become mainstream on the shelves of retail and specialty pharmacies, and supermarkets in recent years. Their appeal is obvious – whereas swallowing a tablet or capsule feels somewhat medical, a format that closely resembles a gummy candy is more approachable and appealing. This is particularly the case for products that are marketed for children, who are far more likely to accept a sweet-sounding supplement over swallowing a capsule.

While gummy format is now widespread, and has high acceptance among consumers, it also has its downsides. Gummies deliver a much lower dose of nutrients per swallow, and have a higher content of sugar per unit dose compared to other chewable dosage forms. Consumers are now more conscious of the high sugar content of some foods, including gummies. An alternative, which remains palatable but looks less like a sweet and contains less sugar, has some distinct advantages.

One such product is the EasyBurst chewable softgel developed by Catalent. Though maximum loading is API dependent, when compared to one dose of gummy, an EasyBurst chewable can loaded with 5-10 times more API. Take DHA as an example, a typical gummy contains 30mg of DHA while Catalent’s EasyBurst chewable softgel can load 200mg of DHA. A recent survey conducted by Catalent showed high interest among parents of children who currently take gummy vitamins. More than ninety percent of those surveyed expressed an interest in purchasing such a product for their children, and two-thirds said they would be likely to switch to an EasyBurst chewable softgel product from the gummies they currently buy.

The chewable softgel has multiple advantages. The product tastes good and delivers a strong burst of flavour along with the benefits of vitamins. It contains less sugar than the typical gummy vitamin, while delivering a higher dose of nutrients in each dose. Importantly, they are convenient in that they do not require water, and are easy to chew and swallow. Of those surveyed, five out of six adults also showed interest in buying EasyBurst chewables for themselves.

The technology behind the EasyBurst chewable softgel format is very closely related to that of the traditional softgel capsule, and is an extremely familiar format to consumers. The modern manufacturing process, originally invented by Dr. Robert Paul Scherer more than 80 years ago, uses two ribbons of gelatin that are brought together between two rotary dies and simultaneously filled to create a closed shell around the liquid contents – but in this case, the resultant softgel is thinner than a standard softgel, and is designed to break when chewed gently, allowing the contents to disperse in the mouth. It also provides benefits in terms of ease of swallowing, compared to swallowable dosage forms, as absorption starts upon chewing.

Effective form and flavouring of the liquid fill results in an appealing product that tastes good and has a pleasant mouthfeel. Another softgel alternative, the Vegicaps® capsule, was also an invention from Catalent to meet the needs of consumers who are looking to avoid animal-derived gelatin. This might be because they are vegetarian or vegan, or because of certain religious beliefs. In a survey of health-conscious consumers, eighty-seven percent expressed an interest in buying non-gelatin gelcaps, and two-thirds would actively consider switching.

These plant-based capsules are free from gluten and genetically modified organisms (GMO), and they contain no fish or dairy products. They look familiar, and retain the easy-to-swallow properties of the gelatin-based originals, and many survey respondents, particularly women, viewed a plant-based softgel as being as beneficial, if not more so, than a standard softgel. This was especially the case when they considered the two products side-by-side.

Again, the manufacturing process is very similar to that used for a traditional softgel. In place of the gelatin ribbons, a ribbon made from the seaweed extract food grade carrageenan, is used along with a modified starch ingredient. They were first developed around the time of the bovine spongiform encephalopathy (BSE) crisis when many consumers and companies wanted to avoid bovine gelatin. The seaweed-based shell material has become commonplace in the Asian market, and is now making inroads in both Europe and North America.

This shell also has other advantages. On processing, the material is more temperature stable than gelatin, can tolerate a wider range of pH conditions, and can encapsulate a wider range of excipients and ingredients without degrading. This permits much smaller softgels, opening the format to those who are unable or unwilling to swallow large capsules. Despite the dominance of the gelatin-based capsule in the supplement arena, opportunities remain for alternative dose forms that improve upon those available, or that meet the supplement arena, opportunities remain for alternative dose forms that improve upon those available, or that meet the needs of consumers who are looking for other types of nutrition. It contains less sugar than the typical gummy vitamin, while delivering a higher dose of nutrients in each dose. Importantly, they are convenient in that they do not require water, and are easy to chew and swallow. Of those surveyed, five out of six adults also showed interest in buying EasyBurst chewables for themselves.

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Health maintenance and disease avoidance are important aspects of an active and productive life. It has been improved, notably by the inclusion of some HMO, which makes it possible for a formula-fed infant to establish a Bifidobacterium-rich microbiome. The microbiome that develops into the adult form and is relatively stable from 20 to 70 years old. In elderly people the microbiome changes and the Bifidobacteria decrease. IMPACT OF DIET ON THE MICROBIOME

Diet exerts a profound effect on the profile of the microbiome and therefore, it is important that an appropriate diet is available throughout life to ensure adequate development and maintenance of the microbiome. This is another and possibly neglected aspect of human nutrition. Generally good nutrition is directed towards fulfilling the development of the infant microbiome, since surgically delivered infants miss the unique opportunity to be colonized with their mother’s vaginal microbiome via the birth canal. The microbiome starts to assemble immediately after birth, and during the first year of life, the infant diet is one of the most important factors that shape the microbiome. The influence of diet on microbiome development is clearly illustrated in infants with different feeding routines, namely breast milk feeding and formula feeding. Breast milk feeding promotes infant health by guiding the proper assembly and activity of the gut microbiome. It is important that a beneficial microbiome is rapidly established in the young infant soon after birth. The initial microbiome of an infant born by caesarean section is similar to that of their mother’s vaginal and faecal microflora. The development of the microbiome depends upon the birth mode and varies according to the postnatal environment. This suggests that exploiting the genetic variation of the body, which can be 80-90% different from one individual to another, could be a better approach to personalized medicine than exploiting the relatively constant human genetic make-up.

DEVELOPMENT OF THE MICROBIOME

It is important that a beneficial microbiome is rapidly established in the young infant soon after birth. The initial development of the microbiome depends upon the birth conditions. Infants born vaginally have a microbiome very similar to that of their mother’s vaginal and faecal microflora. In contrast, the microbiome of an infant born by caesarean section contains bacteria transferred horizontally from the mother’s and others’ skin surfaces and, to a lesser extent, the place of birth. These differences in initial new-born microbiomes may have important health consequences. The microbiome in vaginally-born infants rapidly develops a good population of Bifidobacterium and Lactobacillus which are considered to be health protective. The microbiome of infants born by caesarean section frequently have high populations of Staphylococcus and Clostridium spp. which can be pathogenic. Thus, delivery mode appears to be an important factor in the development of the infant microbiome, since surgically delivered infants miss the unique opportunity to be colonized with their mother’s vaginal microbiome via the birth canal.

The microbiome is an enormous population of various microorganisms which are predominantly bacteria. The size of the microbiome is not easy to estimate but it is generally considered that there are more microbial cells in our gastrointestinal tract than there are human cells in our body. Some of the most significant interactions of bacteria in the microbiome of adults are: Bifidobacterium, Lactobacillus, Bacteroides, Clostridium, Escherichia, Streptococcus and Ruminococcus. The composition of the gastrointestinal microbiome is not fixed but is dynamic and affected by numerous factors including birth conditions, early feeding, gastrointestinal tract infections, genetics, age, stress, medication and diet. The microbiome produces a vast range of products. Fermentation of fibre or protein by bacteria in the large bowel produces short chain fatty acids, acetate, propionate and butyrate, which act as key sources of energy for colorectal tissues and maintain tissue integrity. Short chain fatty acids are also absorbed into the bloodstream and impact immune function and inflammation. Bifidobacterium generate vitamins such as vitamin K, B12, Biotin and Folate. The microbiome produces many enzymes which help to digest food materials. An important characteristic of the microbiome is that it varies greatly among individuals and functions differently than the genetic variation of the body. Individual humans are about 99.9% identical to one another in terms of their basic genetics. However, the microbiome can be 80-90%, different from one individual to another. This suggests that exploiting the variation contained within the microbiome could be a better approach to personalized medicine than exploiting the relatively constant human genetic make-up.

FUNCTIONS OF THE MICROBIOME

The benefit of breast feeding is related to the quality of human milk which contains proteins, fats, carbohydrates and various immunoglobulins. In particular, the carbohydrate fraction of human milk contains an important quantity of special oligosaccharides, known as human milk oligosaccharides (HMO). Infants lack the enzymes necessary to digest HMO so most reach the colon unmodified where they can influence the development of the microbiome. These HMOs selectively stimulate the development of a Bifidobacterium-rich microbiome which is health protective. On the other hand, formula-fed infants exhibit a microbiome with the presence of species of Staphylococcus, anaerobic Streptococcus and Clostridium in addition to Bifidobacterium which is not so beneficial. Recently, milk formulas have been improved, notably by the inclusion of some HMO, which makes it possible for a formula-fed infant to establish a Bifidobacterium-rich microbiome. The microbiome that develops into the adult form and is relatively stable from 20 to 70 years old. In elderly people the microbiome changes and the Bifidobacteria decrease. IMPACT OF DIET ON THE MICROBIOME

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CHARACTERISTICS OF A HEALTHY MICROBIOME

An important parameter of a healthy microbiome is to maintain a stable system. Stability is the ability of the microbiome to resist disturbances such as the entry of a pathogen, alteration of the diet, or administration of medication such as antibiotics and to return to a healthy state afterwards. The ability of the human microbiome to maintain stability is important and potentially disruptive perturbations is important for health maintenance and disease avoidance. How stable is the microbiome? The microbiome has also been generally associated with good health. Conversely, a relative lack of diversity is apparent in the microbiome in diseases ranging from obesity to inflammatory bowel disease and types 1 and 2 diabetes. If the universal features of the healthy microbiome could be defined, then it may be possible to develop a nutritional approach to a predictor of the beginning of a disease. This would make it possible to determine the appropriate interventions to restore health, or prevent the development of health-promoting microorganisms that could then be maintained throughout the lifespan. Therefore, nutrition also now needs to be directly influenced in the maintenance of the microbiome. In the future we need to consider nutrition as a supply of nutrients for the human body and also as a supply of nutrients for the microbiome. It is well established that an optimal feeding of the microbiome will make a major improvement in health maintenance and disease avoidance and thereby improve our quality of life.

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Jennewein Biotechnologie was founded in 2005 with the vision to develop new production processes for complex oligosaccharides. In 2015, we brought our first food-grade HMO (2'-fucosyllactose) to the market. Breastfeeding reduces the risk of infectious diseases in children by up to 50%. HMOs play a major role in this process. Jennewein Biotechnologie is the pioneer and inventor of a unique fermentation process for the production of HMOs identical to those present in human breast milk. Now, non-breastfed babies also have the opportunity to profit from the beneficial effects of HMOs.\(^1\)

New ways to close the fiber gap

. . . a smart balance of dietary fiber, sweetness and good taste

One of today’s biggest nutrition trends around the world is the desire for fiber-enriched products that make adding fiber to the daily diet as easy as possible. Globally, consumers want to increase their fiber intake. And there is a good reason for this healthy attitude: adequate consumption is linked to a reduced risk of nutrition-related diseases such as obesity, hypertension and coronary heart disease, as well as a lower risk of certain cancers and even a more effective immune system. The market for foods that are rich in dietary fiber is therefore highly dynamic.

Current fiber intake

In most European countries, average consumption of dietary fiber is below the recommended levels. For instance, the World Health Organization (WHO) recommends a daily intake of 30 grams of dietary fiber. Considering the fiber content of popular foods (e.g. avocado: approx. 7 g per 100 g portion, apples: approx. 2 g per 100 g portion), many consumers of Western diets aren’t eating enough whole grains, legumes, fruits or vegetables, all of which are important sources of fiber. Therefore, the fortification or supplementation of foods and beverages with dietary fiber is a promising approach to improving the fiber intake – and thus the overall health – of the general population.

The water-soluble bean fiber Sunfiber® from the Japanese company Taiyo provides a simple way to increase everyday fiber consumption, combining an excellent taste profile with all the nutritional benefits and health-promoting properties of dietary fiber. The company has pioneered dietary fiber research for more than 20 years and develops and produces many different functional ingredients, offering multiple new ways to close the fiber gap.

Nutritional benefits for wellbeing

As a water soluble bean fiber, Sunfiber® has all the nutritional benefits of dietary fiber such as being a prebiotic. Sunfiber helps to improve the activity and reproduction rates of beneficial probiotics within the gastrointestinal tract, including Bifidobacteria and Lactobacillus, which are indispensable for efficient and healthy gut flora and thus for overall health and wellbeing.

As well as helping to ensure healthy digestion, Sunfiber® slows down and reduces the rise of blood glucose and blood lipids. For this reason, it has received a Health Claim for lowering after-meal blood glucose levels by 20 percent from the Canadian Health Authorities.

Furthermore, Sunfiber® offers a number of clinically substantiated health benefits for the entire body. For example, when consumed with a meal, it improves the absorption of minerals such as calcium and magnesium.1 In addition, the fermentation rate is very low, which means that it doesn’t result in painful gas, cramping or discomfort.

A natural ingredient with multiple certifications

Sunfiber® is made from a naturally occurring raw material: guar. It is suitable for use in a variety of foods and beverages and has no objectionable impact on the flavor, color, con-sistency or aroma of the products to which it’s added. The newest additions to the Sunfiber® range are Sunfiber® Curcumin, Sweet-Sunfiber® and SunCran®-Naturelle. Sunfiber Curcumin is a 100% water dispersible Curcumin with a great taste that uses no emulsifiers and no E-Numbers, but boosts the Curcumin bioavailability just by using two different dietary fibers to disperse the curcumin in water. The Sweet-Sunfiber® compound contains isomalto-oligosaccharides and can also be used as a sweetener, whereas the SunCran®-Naturelle variant promotes the benefits of a natural Cranberry juice and Sunfiber, where both ingredients have synergies on promoting the human microbiom and that has the natural sweet, sour and fruity taste of cranberries. All new Sunfiber versions combine the health-promoting properties and technological benefits of Taiyo’s dietary fiber ingredient with a mildly sweet and great taste profile.

For Taiyo, naturalness along the whole supply chain is incredibly important, beginning with the fact that its guar plant seeds grow in fields that are free from chemical treatment. During processing, no preservatives are used or added. Furthermore, the ingredient is organic, non-GMO and gluten-free. All of the company’s products are all natural, Kosher and Halal, and 100 percent suitable for vegans and vegetarians.

Perfect for a low FODMAP diet

Another benefit of Sunfiber® is that it is suitable for those on a low FODMAP diet. In the gut, people with irritable bowel syndrome (IBS) have a heightened sensitivity to certain foods called FODMAPs. FODMAP components are fermented by gut flora and this process is believed to be the cause of gastrointestinal complaints such as bloating, gas, diarrhea, constipation and cramping in sensitive patients. In a clinical study published in 2010, the positive effect of a low FODMAP diet on the symptoms of FODMAP-restricted IBS was reported.3 A low FODMAP diet compounds like dietary fibers are therefore often recommended for patients with digestive sensitivity, especially those with IBS. However, removing dietary fiber also takes away the foundations for good intestinal health. In this case, Sunfiber® can fill the nutritional void by supplying soluble and prebiotic dietary fibers that are compatible with a low FODMAP diet and suitable for people with digestive sensitivity, such as people with IBS.

Various application possibilities

Supplied as a versatile powder, Taiyo’s ingredient can be used to fortify bakery and dairy products, confectionery as well as meat and savory foods. Easy to incorporate into existing formulations, it has no discernable impact on the sensory properties of the final product. Other potential applications include dietary supplements and regular, instant or ready to drink beverages. By combining Sunphenon® Instant Tea powders with Sunfiber®, a fibre-enriched tea drink can be produced. This “Fiber-Tea” concept is the ideal fiber source for all target groups.

As it is totally soluble, the ingredient mixes perfectly in water as well as in other hot and cold beverages, including smoothies. Producing a healthy safety evaluation for dietary fibers gives the excellent ingredient for medical nutrition diets and special diet foods. Sunfiber® is available in different qualities, depending on the desired application and claims. It is stable at various pH levels and resistant to heat and thawing.

Fully compliant with US labeling requirements

After the US Food and Drug Administration (FDA) strengthened its labeling rule for fiber in 2016, only five fibers now fulfill the new FDA definition – and Sunfiber® is one of these, having shown enough scientific evidence to be classed as a “true dietary fiber”. The FDA’s definition for dietary fiber changed from being just an analytical and methodological definition to requiring that the fiber should deliver actual, clinically substantiated benefits in healthy humans.

Now, countless food, beverage and supplement manufacturers are faced with having to confirm that their functional compounds qualify as dietary fiber meet the new requirements. Otherwise, these products will have to be relabeled as containing “carbohydrate” rather than fiber. However, producers of Sunfiber® can be confident moving forward of being compliant without having to change anything.

What are FODMAPs?

FODMAP is an abbreviation for “fermentable oligo-, di- and mono-saccharides and polyols”. These fermentable multiple double and single sugars and polyol alcohol – sugars include fructose, lactose, galactose and stachyose, whereas polyol alcohols like sorbitol, mannitol, xylitol and maltitol. They are found in many foods, such as lactose-containing products, whole grain products and various fruits and vegetables. The FODMAP concept is based on the assumption that the functional complaints in the gastrointestinal tract experienced in irritable bowel syndrome are mostly due to flatulence. During the fermentation of FODMAPs, gases are produced in the intestine, and it is these that are generally responsible for symptoms.

Why dietary fiber is so important

- A diet rich in fiber would save many people from gaining weight because fiber slows down the blood glucose level after eating and keeps it constant for a lengthy period of time. The body also requires less insulin. As a result, there is a feeling of satiety, which means that signals are no longer present for hunger. In addition, food that is rich in fiber has to be chewed for longer and more intensely, which leads to a more lasting feeling of fullness. A high level of fiber consumption also boosts digestive juices, leading to a general stimulation of intestinal movement. Transit time is shortened, counteracting hemorrhoids and general feelings of bloating.

- Current studies show that dietary fiber can prevent colon and prostate cancer because carcinogenic substances are diluted and pollutants are excreted faster.

- The human body is unable to break down dietary fiber enzymatically, which is why it reaches the large intestine intact. Once it reaches the large intestine, fiber is used as a substrate for fermentation of intestinal flora bacteria such as lactobacilli and bifidobacteria. These bacteria are thus encouraged to grow and thrive. This is important as they increase stool volume and help to prevent constipation.

- Healthy intestinal flora is essential for a fully functional immune system. In a healthy body, the short-chain fatty acids acetate, propionate and butyrate are formed during the fermentation of dietary fiber. These partially resorbed and transported to the liver where they contribute to the formation of cholesterol, thus contributing to reduced cholesterol levels. The short-chain fatty acids also provide the cell membranes with energy and improve the absorption of minerals.

For more information: Dr. Stefan Siegbrecht, Managing Director, Taiyo GmbH www.taiyogmbh.com

References
Todays’ nutraceuticals industry is rapidly changing with everyday technical breakthrough and innovations which allow customers to choose the best and most sophisticated ingredients and services that they could not avail in the past. At the same time these technical advancements also misled the customer towards falsified products as unethical suppliers were driven to craft a custom-made offer standing apart for its quality and transparency, certifications and third party authentication, sustainability and 100% traceability, ensuring customers to source a variety of raw-materials, products and services through its network. To give an example if a customer in USA requires a product that Vidya Herbs USA doesn’t hold in stock, rest assured that Vidya will try to locate and source it from its own global network and meet their needs along with its top-class quality assurance. Vidya Herbs’ Research Center Vidya Herbs R&D Center of Excellence is proud of its array of botanical sources. And marketing of phytochemicals and carotenoids derived from botanical sources. Vidya Herbs has local manufacturing or local offices in almost every part of the world - United States, EU (and EEC), CIS, South Korea and Japan. Our dedicated freight and logistics division satisfy our buyers with close, personal attention and are willing to walk the extra mile to meet customer’s expectations and ensure their satisfaction and ultimately assure their success in using our materials. The strategic locations also enable Vidya to assist its customers to source a variety of raw-materials, products and services through its network. To give an example if a customer in USA requires a product that Vidya Herbs USA doesn’t hold or supply, rest assured that Vidya will try to locate and source it from its own global network and meet their needs along with its top-class quality assurance.

About Vidya Herbs
Vidya Herbs is a progressive phytochemical and phytonutrients company with extensive expertise, interest and deep passion in discovery, research, development, extraction, stabilization and marketing of phytochemicals and carotenoids derived from botanical sources. Vidya Herbs has local manufacturing or local offices in almost every part of the world - United States, EU (and EEC), CIS, South Korea and Japan. Our dedicated freight and logistics division satisfy our buyers with close, personal attention and are willing to walk the extra mile to meet customer’s expectations and ensure their satisfaction and ultimately assure their success in using our materials. The strategic locations also enable Vidya to assist its customers to source a variety of raw-materials, products and services through its network. To give an example if a customer in USA requires a product that Vidya Herbs USA doesn’t hold or supply, rest assured that Vidya will try to locate and source it from its own global network and meet their needs along with its top-class quality assurance.

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Omega-3 Fatty Acids

Fats are a group of nutrients that are vital for correct tissue development and function. Fatty acids, which comprise a type of fat, are distinguished based on their points of saturation and carbon chain length. Well known fatty acid groups are the omega-3 and omega-6 fatty acids, which are differentiated based on the location of a specific chemical bond. Most fatty acids can be synthesized by a human through normal metabolism and do not need to be consumed through diet. However, fatty acids such as omega-3s, which are not synthesized are called essential fatty acids because they must be acquired through diet. Essential polyunsaturated fatty acids (PUFAs) are docosahexaenoic acid (DHA), eicosapentaenoic acid (EPA) and alpha-linolenic (ALA). DHA and EPA are the nutritionally important long-chain PUFAs, while ALA is a short-chain PUFAs that is less nutritionally valued than DHA and EPA.

Our Strain: T18

Currently, the major nutritional source of omega-3 fatty acids is by the consumption of oily fish such as sardines, salmon, tuna, and herring, as well as their corresponding processed oils, which faces sustainability issues. These essential oils, accumulated by fish, are derived from microorganisms and concentrated up the food chain. The United Nation’s State of World Fisheries and Aquaculture report that one-third of commercial fish stocks are currently fished at a biologically unsustainable level. It is anticipated that the traditional fish-extracted source of omega-3 fatty acids will be unable to adequately supply the world's future omega-3 needs. As a result, alternative means to supply omega-3 fatty acids are being developed.

Microalgae are the primary producers of aquatic ecosystems and represent the origin of essential nutrients, including omega-3 fatty acids. Microalgae from the genera Phaeodactylum, Micromonas, and Schizochytrium present natural, highly productive sources of omega-3 fatty acids, DHA and EPA. Mara has evolved a nature-sourced marine microalgal strain, T18, for the production of DHA rich omega-3 fatty acids. We strive to contribute significantly to global food and environmental security through reduced supply dependence on resources such as fish oil. Currently, we commercially farm our algae via fermentation and use a solvent-less extraction method to produce our crude free flowing omega-3 oil at our European production facility, Algal Omega-3 Limited, to service our global customer base.

Mara Renewables Corporation

Mara Renewables Corporation (Mara) is a Canadian biotechnology company that focuses on the research, development, and commercialization of sustainable and natural biotechnologies for human nutrition and related industries. Mara has evolved a nature-sourced marine microalgal strain, thraustochytrid T18, for the production of DHA rich omega-3 fatty acids. Mara’s mission is to develop and continually improve upon its unique, proprietary, and patent-protected technologies and to become the preferred supplier of omega-3 fatty acids to human nutrition and related industries.

We strive to contribute significantly to global food and environmental security through reduced supply dependence on resources such as fish oil. Currently, we commercially farm our algae via fermentation and use a solvent-less extraction method to produce our crude free flowing omega-3 oil at our European production facility, Algal Omega-3 Limited, to service our global customer base.

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### References


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Finding the “Spark”

... the nexus of iron and magnesium in energy production for active lifestyles

Our active lifestyles vary greatly from person to person. Activities range from walking, to biking, to triathlons and everything else in between. Despite the varying activities, there is one thing that they have in common - the need for energy. The more activity, the more energy is required to move our bodies to perform. Without that energy, we tire easily or lose the desire to be active.

How Iron and Magnesium Provide “Spark”

Since the key to activity is to have energy, we should have a focus on increasing the energy output. For energy output, our bodies need three general things: fuel, oxygen, and “spark.” Availability of oxygen is generally not a problem, except at very high altitudes or underwater. Also, with proper nutrition, availability of fuel (carbohydrates, fat and protein) is typically not a problem. In fact, our bodies are very adept at conserving and storing excess fuel for later consumption. The availability of “spark” is often the limiting factor to maximal energy production. This “spark” is created by the enzymes, vitamins, and minerals needed to convert the fuel and oxygen into the energy needed by the body.

Two “sparks” that are essential to energy output are iron and magnesium. Without them, there would not be any energy for our bodies. Conversely, lack of energy is often symptomatic of the deficiency of these two essential minerals.

Tough as Iron Performance

Iron is well known for its role in hemoglobin in transporting oxygen to tissues. It also has a role in myoglobin, a similar molecule to hemoglobin, which is involved in oxygen storage in the muscle tissues. It is also a critical component of cytochrome C in the mitochondria which is involved in the electron shuttle of the energy cycle. Iron deficiency anemia is still considered by the World Health Organization as the largest nutritional disease. An active lifestyle can contribute to low availability of this nutrient. In a study of female runners, it was found that a dietary supplement would alleviate these deficiencies and risks. While this may be true, there are considerations, complications and cautions associated with iron and magnesium supplements.

Iron supplements are well known for gastrointestinal distress with common symptoms including nausea, blackened stools and constipation. Interactions with dietary components can influence iron bioavailability as well. Inhibitors include polyphenols in coffee and tea. Other components such as oxalates from spinach, high calcium intakes, fiber and phytates can all interact with iron in the gut to prevent optimal absorption. Conversely compounds such as ascorbic acid can enhance iron uptake. Individual iron status can also impact response. In a study examining why there was such a varied response to iron supplementation in athletes, it was found that approximately 11% had iron overload as defined by greater than 200 mcg/L, which accounted for the variation in response. Magnesium supplementation can also cause gastrointestinal distress. Magnesium is a macromineral and so is required in larger amounts. Large doses, particularly when taken in a single dose, can cause significant gastrointestinal distress manifested commonly with gas and laxation. Magnesium can also have negative interaction with dietary compounds such as phytates and calcium. It is much harder to assess biological magnesium status as there is no commonly acceptable clinical marker with rapid response.

Form Matters

So how do we as active people make sure that we consume or supplement with adequate “spark” nutrients to optimize energy production without encountering the common negative side effects? Fortunately, there is an available solution – metal chelates. These are compounds where the metal is bonded to nutritionally functional organic compounds such as creatine or amino acids. These compounds provide increased bioavailability of “spark” nutrients with greater tolerability compared to other compounds.

Ferrous bisglycinate (iron chelated to two glycine molecules) has been shown to have lower incidence of complaints of gastrointestinal distress in pregnant women as well as significantly lower incidence of blackened stools10 In another double-blind placebo controlled study, ferrous bisglycinate had approximately half the number of moderate to severe side effects and was preferred by three times the number of women compared to iron sulfate.11 Magnesium bisglycinate, like ferrous bisglycinate, has been shown to cause less gastrointestinal distress. In a study of pregnant women, a 300 mg dose of magnesium was compared to a placebo and it was found that there was no difference in terms of diarrhea and other side effects.12 In another study, there was no significant increase in adverse events with increasing dosages (200, 450, and 600 mg) of magnesium bisglycinate as compared to a placebo. There was even an improvement in fecal consistency scores at the higher dosages.12

Get the Spark

In conclusion, iron and magnesium are the “spark” nutrients that allow oxygen and fuel from our diets to be combined and converted into energy that allows our bodies to move and perform at their best. They allow us to maintain an active lifestyle and optimize that burning of fuel. Supplements may be beneficial and prudent to prevent a limiting effect on this fuel conversion, but may present problems associated with tolerability and interactions with other compounds. As a result, it is important to select a compound such as bisglycinate chelated forms of the minerals can help overcome these problems and can be a solution that allows optimal oxidative fuel conversion to energy.

About the Author:

Stephen Ashmead, MS, MBA, is a Senior Fellow for Balchem Corporation. He received a BS degree in Biology, a MS degree in Nutrition Science from the University of Utah, and his MBA from Western Governors University. His area of specialty is in mineral amino acid chelates and their functions.

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As the benefits of astaxanthin are becoming more widely known, many dietary supplement manufacturers are turning to it as an important nutritional ingredient. What are some of the considerations for manufacturers in finding the right supply partners for the ingredient? Charles Faulkner spoke with Dr. Tryggvi Stefánsson, science manager at Algalif to get his perspectives and some straightforward tips for sourcing quality astaxanthin.

**CF: What are the key nutritional benefits of astaxanthin?**

**TS:** Astaxanthin stands out as a valuable natural antioxidant for nutraceuticals due to its superb nutritional advantage. Astaxanthin is 6,000 times more powerful than Vitamin C, 100 times more powerful than Vitamin E, and five times more powerful than beta-carotene in its ability to trap energy from singlet oxygen. [1] Therefore, you need a higher dosage of these other antioxidants to have an effect. For vitamin C, for example, you could expect to find 1000mg per serving and 20-40mg for lutein, etc. In addition, the numerous health benefits of astaxanthin are supported by extensive research, including over 50 human clinical studies and more than 1400 peer-reviewed scientific papers. [2] There is also sufficient qualitative and quantitative scientific evidence, including human and animal data, to support the safety of astaxanthin from microalgae. [3-7]

**CF: What are some finished product applications that astaxanthin is well suited for?**

**TS:** Because of its multiple health benefits, astaxanthin can be used in a variety of formulations addressing different health concerns such as brain health, eye health, healthy aging, cardiovascular health, muscle endurance/recovery, and skin health. Consequently, the potential target market for astaxanthin products is wide, ranging from younger consumers that are interested in improving athletic performance to senior consumers that are concerned with age-related health challenges. From a production standpoint, soft gel encapsulation is an effective way to protect the biological activity of astaxanthin in supplements as it protects astaxanthin from thermal or oxidative damage during manufacturing, transportation and storage.

**CF: What are the sources of astaxanthin?**

**TS:** Astaxanthin is a carotenoid that occurs naturally in aquatic animals such as lobsters and salmon (contributing to their pinkish-red color) and in many fruits and vegetables. Although it can be produced synthetically from petrochemicals, the natural version is far superior in terms of efficacy and safety. As an ingredient for dietary supplements, the best source of astaxanthin is the microalgae Haematococcus pluvialis due to its high astaxanthin concentration. Using an optimized production process, more than 60,000 mg of pure natural astaxanthin can be obtained from one kilo of algal biomass. [3]

**CF: What methods are used in the harvesting and production of algae-based astaxanthin?**

**TS:** Microalgae cultivation is a technical and highly-skilled process, and it is essential for buyers of astaxanthin to know where the ingredient has been produced and under what conditions. Haematococcus pluvialis can be cultivated in open-pond or photobioreactor systems. Although open-ponds are cheaper to build, they have been shown to enable optimal growth of the microalgae, continuous cultivation, and high yields of pure astaxanthin, increasing the culture reliability and overall productivity. Moreover, photobioreactor cultivation systems help to protect the culture from external contamination.

**CF: What certifications should manufacturers look for?**

**TS:** Natural astaxanthin has GRAS status in the United States. It is important that the astaxanthin is produced in a cGMP compliant facility. The market is demanding additional tests and validations of ingredient quality and purity, including non-GMO project verified, Halal, Kosher, gluten-free, allergen-free, free of heavy metals and solvents.

**CF: Are there environmental considerations in sourcing astaxanthin?**

**TS:** Algae is more sustainable than conventional crops because it requires little input to be kept alive. However, algae cultivation, depending on the setup, can require substantial amounts of water and energy. Therefore, conservation techniques should be in place such as production methods that allow for minimal water evaporation and specialized lighting systems to reduce energy consumption. In fact, because energy is essential for microalgae cultivation, electricity requirements can cause environmental burdens if manufacturers rely on non-renewable energy resources. Consequently, responsible astaxanthin suppliers take quality, purity, and sustainability seriously. This combination is highly relevant in today’s market as both manufacturers and consumers demand more information about how and where raw materials are sourced.

**CF: What other things should be taken into account regarding ingredient purity?**

**TS:** As the primary input for microalgae cultivation, the importance of water purity cannot be overstated. Due to the high biosorption capabilities of microalgae, any trace amount of heavy metals or other contaminants present in the water will accumulate and magnify in microalgae cultures. Due to human activities, heavy metal concentrations in water exceed maximum permitted levels in many parts of the world. Therefore, responsible astaxanthin manufacturers have access to clean water sources and ensure that their products are strictly and routinely monitored for heavy metals and other contaminants.

The natural products industry moves towards greater transparency regarding manufacturing practices, sustainability, and country of origin, closely followed by well-informed consumers who also actively look for transparency to help them make their purchase decisions. Reliable, responsible astaxanthin suppliers take quality, purity, and sustainability seriously. This combination is highly relevant in today’s market as both manufacturers and consumers demand more information about how and where raw materials are sourced.

**References**

However, as a true all-rounder, the natural ingredient offers in a host of branded single supplement products targeting Kaneka Ubiquinol™ is already enjoying market success combination products. It reacts very quickly with oxygen when vitamin-like substance for use in either single supplements or market because until recently it was impossible to isolate the Ubiquinol is a relative newcomer to the sports nutrition caused by illness, unhealthy lifestyles or strenuous physical levels decline with age as well as after periods of stress Ubiquinol is also an essential part of the body’s respiratory coenzyme Q10, is the only lipid-soluble antioxidant that An essential component supplements and how it can be included in a variety of hulle, Senior Manager at Kaneka’s Quality of Life Division, It is fitting that almost exactly 100 years after Sir Ernest Shackleton’s Antarctic expedition, Ubiquinol, the nutrient that is believed to have kept him and his team alive in the harshest possible conditions, is taking centre stage at Vitafoods. Ubiquinol is a relative newcomer to the sports nutrition market because until recently it was impossible to isolate the vitamin-like substance for use in either single supplements or combination products. It becomes energized with oxygen when exposed to air, and turns into its oxidised form, coenzyme Q10. However, after more than ten years of research and development, Kanea succeeded in developing the world’s first stable, bio-identical Ubiquinol. This patented ingredient is marketed under the brand name Kanea Ubiquinol™, and is produced via a patented process. Kanea Ubiquinol™ is already enjoying market success in a host of branded single supplement products targeting heart health, energy and mitochondrial disease. However, as a true all-rounder, the natural ingredient offers huge potential for the sports nutrition market. To demonstrate just some of the ways it could be utilized in this sector, Kanea has developed a range of Sports Prototypes that will make their European debut at Vitafoods this year.

Sports Prototypes to suit every need

Today’s sportspersons – whether elite professionals or enthusiastic amateurs – are well informed and well equipped, and they want to make the most of everything they have and everything they do. Across all disciplines and reinforced by media, social media and multi-channel communication, those who take part in sports know what they want and need to do in order to improve their performance and preserve their capabilities. Used in combination with various other appropriate nutrients, Ubiquinol can provide the competitive edge that so many people are looking for. Processed in different stable application forms, Kanea’s five Sports Prototypes illustrate just some of the ways in which Ubiquinol can be used to great effect in sports supplements:

To provide the body with all round energy before or after training, Kanea’s Ubiquinol All Day Energy soft gel capsules are a daily use supplement containing 100 mg Ubiquinol. Repeated studies among professional sportspersons show that the higher the Ubiquinol plasma level, the greater the performance capacity and the longer the time until fatigue. It has been proven that the first positive effects are noticeable after just ten days of supplementation.1 In addition, Ubiquinol is able to significantly enhance peak power production in comparison to placebo in trained athletes2. For those taking part in extreme sports, such as triathlons, or people preparing for competition, Ubiquinol Flash combines 150 mg Ubiquinol in a special stabilized form with magnesium. This innovative product is presented in the form of powder sticks that can be taken without water during training or while on the move. The powder format is absorbed by the body more quickly than a capsule would be, so Ubiquinol taken this way boosts energy immediately and peak plasma levels can be achieved in a short space of time. Kanea has chosen to combine Ubiquinol with magnesium in this Prototype because the essential macro-mineral is important for muscle contraction and a lack of it can lead to cramps and muscle weakness.

While medium to intense sporting activity is associated with high power performance, it also leads to increased production of reactive oxygen species (ROS), lowered vitamin levels and, therefore, to cell damage. A recent trial3 based on short-term supplementation of 200 mg/day Ubiquinol before strenuous exercise for two weeks showed a decrease in oxidative stress and an increase in plasma nitrogen oxide. This resulted in improvements in endothelial function, energetic substrate supply and muscle recovery after workout. To counteract deficits and strengthen defence mechanisms, Ubiquinol Immunity combines multivitamins plus 30 mg of Ubiquinol. Presented as a GelPel®, a hard gelatin capsule filled with gelatin beads, continuous absorption over the long term guarantees optimal effects.

As well as immune defense and recovery, the building of muscle mass is often of paramount importance to those taking part in sport at all levels. Targeting this, Ubiquinol Muscle combines soft gelatin capsules containing 60 mg Ubiquinol and 60 mg of Kanea’s unique and patented licorice extract Glavonoid™. Muscle protein synthesis and breakdown is a dynamic equilibrium. Strength training is essential, but it triggers inflammatory processes inside the muscle fibers that lead to pain and an imbalance of amino acid levels4. It has been shown that antioxidants in combination with protein ameliorate inflammatory mechanisms in this context. A recent study has also confirmed that in combination with exercise, Glavonoid™ can contribute to the maintenance of, and even increase, skeletal muscle mass.5 After training as well before, Ubiquinol Repair is able to improve recovery and create new energy. The gel, consisting of 100 mg stabilized high-purity Ubiquinol powder, 500 mg carnitine, 1000 mg branched chain amino acids (leucine, isoleucine and valine) plus vitamins, is designed to be taken after training, but can also be taken pre-workout for an extra boost. This format is quickly and easily absorbed by the body, has excellent bioavailability and is therefore ideal for those looking for instant effects.

Tried and tested in the field

Aside from the raft of clinical research that backs up the power of Ubiquinol, a great deal of usage evidence plays testament to its efficacy. It is popular among a growing number of professional athletes, for whom its categorization as “non-doping” is an important consideration. In Japan, for instance, the Olympic weightlifting team has officially reported on their power improvements following regular Ubiquinol intake. Australian Olympic middle-distance runner Louise Wellsing is convinced of the benefits of Ubiquinol supplementation too. “I don’t take anything I feel I don’t need,” she explains. “I try to focus on nutrients that I feel will assist me in my recovery as I’m training and competing so frequently. I rely on Ubiquinol for both recovery and muscle mass gain.” The team doctor for Germany’s 2016 Olympic weightlifting squad, Dr. Dominik Dörr, adds: “Ubiquinol is one of the body’s own substances and you simply replace what has been lost. Kanea’s extraction and processing methods are totally safe and effective, with standardisation levels that guarantee that the correct dose of the bioactive ingredients is delivered and will be able produce the expected health benefits.” The team doctor for Germany’s 2016 Olympic weightlifting squad, Dr. Dominik Dörr, adds: “Ubiquinol is one of the body’s own substances and you simply replace what has been lost. Kanea’s extraction and processing methods are totally safe and effective, with standardisation levels that guarantee that the correct dose of the bioactive ingredients is delivered and will be able produce the expected health benefits.” The team doctor for Germany’s 2016 Olympic weightlifting squad, Dr. Dominik Dörr, adds: “Ubiquinol is one of the body’s own substances and you simply replace what has been lost. Kanea’s extraction and processing methods are totally safe and effective, with standardisation levels that guarantee that the correct dose of the bioactive ingredients is delivered and will be able produce the expected health benefits.” The team doctor for Germany’s 2016 Olympic weightlifting squad, Dr. Dominik Dörr, adds: “Ubiquinol is one of the body’s own substances and you simply replace what has been lost. Kanea’s extraction and processing methods are totally safe and effective, with standardisation levels that guarantee that the correct dose of the bioactive ingredients is delivered and will be able produce the expected health benefits.” The team doctor for Germany’s 2016 Olympic weightlifting squad, Dr. Dominik Dörr, adds: “UBIQUINOL: as a supplement for endurance all year and run up to 600 kilometers per month. Overall, I feel less exhausted after training and have hardly ever been ill since starting supplementation.

With these sorts of testimonials behind it, Ubiquinol now looks poised to win further success in the world of sports nutrition. “Our Sports Prototypes are just examples of what can be achieved with the Power of Ubiquinol,” says Filip Van hulle. “We see Vitafoods as a springboard to creativity and to unlocking the potential of this incredible nutrient in a variety of ways through the increasing consumer demand for products that boost performance and recovery among sportsmen and women at all levels.

Beware of impostors

Kanea Ubiquinol™ is identical to the Ubiquinol made by the human body. However, the nutrient’s growing popularity means there are an increasing number of “fake” products coming onto the market. These might be labeled as containing Ubiquinol, whereas they in fact contain Coenzyme Q10. There is also a synthetic form of Ubiquinol, but this is not the same as the body’s own Ubiquinol, it has not been safety tested, and there is a lack of clinical and consumer recognition and guarantee efficacy. Kanea has developed a “quality seal” that confirms the authenticity of its Ubiquinol™ packaging. More information on Kanea’s Ubiquinol™ can be found online at www.kanea-ubiquinol.com

References


Powered by Ubiquinol

It is fitting that almost exactly 100 years after Sir Ernest Shackleton’s Antarctic expedition, Ubiquinol, the nutrient that is believed to have kept him and his team alive in the harshest possible conditions, is taking centre stage at Vitafoods. Visitors to the exhibition will notice that their badges bear the message: “Powered by KANEKA Ubiquinol™, and Filip Van hulle, Senior Manager at Kaneka’s Quality of Life Division, explains why: “Ubiquinol is an essential nutrient that plays a role in all of the body’s processes. At Vitafoods this year, we want to show why it is a perfect fit for sports and fitness supplements and how it can be included in a variety of application forms for different needs.”

An essential component

Besides being found in small amounts in certain foods, Ubiquinol, the reduced and more bioavailable form of coenzyme Q10, is the only lipid-soluble antioxidant that is produced naturally in the human body. It preserves mitochondrial functionality, accelerates cellular recovery processes and has a powerful ability to fight the signs of aging. Ubiquinol is also an essential part of the body’s respiratory chain, which is responsible for more than 95% of our total energy production. Unfortunately, the body’s Ubiquinol levels decline with age as well as after periods of stress caused by illness, unhealthy lifestyles or strenuous physical activity.

Poised for success

Ubiquinol is a relative newcomer to the sports nutrition market because until recently it was impossible to isolate the vitamin-like substance for use in either single supplements or combination products. It becomes energized with oxygen when exposed to air, and turns into its oxidised form, coenzyme Q10. However, after more than ten years of research and development, Kanea succeeded in developing the world’s first stable, bio-identical Ubiquinol. This patented ingredient is marketed under the brand name Kanea Ubiquinol™, and is produced via a patented process. Kanea Ubiquinol™ is already enjoying market success in a host of branded single supplement products targeting heart health, energy and mitochondrial disease. However, as a true all-rounder, the natural ingredient offers huge potential for the sports nutrition market. To demonstrate

References
INTEGRATED APPROACH OF SUBSTANTIATING HEALTH BENEFITS

By Alwine Kardinaal, Erik van Zandbergen – NIZO, Ede, The Netherlands

Healthy ingredients, foods and diets can help maintaining health. That seems a well-known fact, but for specific claims, regulatory agencies worldwide expect food industry to provide evidence for their benefits. Evidence coming from sound scientific studies. The relationship between nutrients and health is difficult to substantiate, mostly because effects of nutrients are relatively subtle and may become apparent only at the long term. In addition, since great biological variation exists in what is considered healthy, it is difficult to interpret the benefits of nutrients to individuals, within what is considered to be a normal range. This asks for an integrative approach that combines scientific and regulatory knowledge, targeted preclinical studies, well-designed clinical trials, biomarker analysis and expert interpretation.

Defining the right research strategy
Building the right strategy starts with defining the final objective that is to be achieved. This leads to a focused development program in which all the steps, from in vitro assays to in vivo experiments and clinical trials become well aligned, and all contribute to the final goal. Moreover it will allow the company to manage budgets and timelines, as well as scientific outcomes.

A critical review of existing evidence can help in determining whether the targeted health benefit is likely to be affected by an ingredient, or in designing a screening approach to generate new data on potential efficacy. Thorough knowledge of EFSA guidance and opinions is required to select the most appropriate design and outcome measures for a clinical trial. NIZO has developed research tools as part of such an integrated approach.

Traditional designs and their challenges
An important area where diet may make a difference, is the resistance to infectious diseases, both non-infectious and the gut, have a high incidence and an important impact on general health, worldwide. To demonstrate that an ingredient supports resistance to pathogens, it is necessary to show that the number of infections in the target group decreases or the severity or duration of the infection period decreases. In addition, it must be absolutely clear that these symptoms are the result of infection with a bacterium or virus. The traditional studies to demonstrate effects on incidence or severity of infection are large human field studies during a longer period of time, during which spontaneous exposure to pathogens is expected to occur. In order to enhance effectiveness of the study, it is possible to select a study population that has an increased risk of exposure to pathogens (for example, travelers to certain countries), or a population with increased susceptibility to infection, such as heavily trained top athletes, the elderly or children (1). But still these studies require many participants and a long duration because it is uncertain how many of the participants will be exposed to certain pathogens and thus become infected. Moreover, a lower incidence of naturally occurring infections during that period may influence the results.

Challenge models as an effective alternative approach
In daily life, healthy subjects have to cope continuously with changes in their internal and external environment. This concept of ability to adapt to stressors forms the basis of so-called challenge tests and offers an attractive alternative approach. In case of resistance to bacterial and viral infections, the challenge is an exposure to (attenuated) bacteria, viruses or vaccines, and the effect of ingredients / foods on the course of the disease and the support of the human defense mechanism is measured. An advantage of well-designed and validated challenge studies is that test conditions are better controlled and allow sampling at the most relevant time points. Because the infection rate is known in advance, a smaller study population is required, which reduces costs and timelines, compared to larger field studies.

Infection challenges
NIZO has developed controlled studies with pathogens, for which fewer participants are required. In the E. coli model, healthy volunteers are exposed to an attenuated form of the E. coli strain (ETEC) that causes traveler’s diarrhea (2). This attenuated variant does not produce toxins and there is no translocation through the intestinal wall, but symptoms such as diarrhea do occur. Subjects are randomized to the different treatments and a single oral dose of the attenuated E. coli is given a few weeks after the onset of food intervention. As a result, subjects get mild to moderate symptoms of gut infection, usually for a day or two. Symptoms and other measurements of health are monitored up to several weeks after infection. Primary outcomes of this study design are the symptoms of intestinal infection, especially severity and duration of diarrhea.

The effect of the nutritional intervention, for example on the intestinal microbiota, can be measured initially before E. coli infection occurs. Subsequently, it can be evaluated whether there is a protective effect against the E. coli infection itself. This research model has shown that calcium protects against diarrhea by E. coli infection: the duration of symptoms was significantly shortened in the calcium group compared to a placebo group (3). A similar model that uses controlled infection is the rhinovirus (common cold virus) model, for which NIZO collaborates with a world-class academic clinical partner. The virus is administered through the nose, inducing common cold symptoms in almost 100% of the study population (4). Primary outcomes are severity and duration of symptoms, as assessed by validated questionnaires. In this model it is also possible to look at the presence of pathogens as well as clinical symptoms, which meets an important condition of the EFSA panel.

Vaccination
Vaccination is a known strategy to build up resistance to infection. A higher response to vaccination (measured as an increase in antibody titer, or the percentage of subjects having a protective level of antibodies) is generally seen as a beneficial effect, also by EFSA. An increase in protective antibody titers can therefore also be used as a measure of effectiveness to demonstrate that a nutritional ingredient has a beneficial effect on the immune system. For example, response to hepatitis B vaccination has been used to evaluate the effect of conjugated linoleic acid on immune function (5). Relevant in relation to local effects in the gut is the response to oral cholera vaccination.

Metabolic challenges
Another extremely relevant area where diet definitely plays a role, is that of metabolic health: how is the body using fats, proteins and carbohydrates in relation to energy requirements. Metabolically unhealthy conditions include obesity, insulin resistance and diabetes, high blood pressure, and high blood lipids, all of which are important risk factors for increased morbidity and mortality, and showing increasing trends on a global scale.

Evidence for the effect of dietary compounds in maintaining metabolic health is something that may be easier to measure after a metabolic challenge. Metabolism may for instance be challenged by the administration of a high amount of fat or glucose, or by strenuous exercise. Multiple measurements during a relatively short time span will describe the kinetics of an integrated set of biomarkers in response to challenge, as a marker for resilience of the metabolism. The oral glucose tolerance test is a well-known example of such a challenge. Plasma glucose concentrations return to homeostasis within 2 hours after a standardized dose of glucose in healthy subjects (optimal flexibility), but remain elevated for a longer period in subjects with disturbed glucose metabolism (impaired flexibility). High-fat or mixed meal challenge tests (including carbohydrate, lipid as well as protein) are used to study lipid metabolism and metabolic flexibility (6), but also induce low-grade postprandial inflammation and endothelial dysfunction.

The response to challenges may be used to derive biomarkers for maintenance of physiological function and ultimately as indicator for prevention of (metabolic) diseases.

Vascular function
In addition to the clinical laboratory biomarkers, non-invasive imaging tools have become available to evaluate changes in vascular function as a result of dietary interventions. Endothelial function, which can reproducibly be measured by flow-mediated dilatation, is a validated marker of heart health and has been shown to rapidly improve upon specific health interventions (7). In the food area, polyphenolic ingredients have been demonstrated to have this benefit.

Role of microbiome
Our gut microbiome is receiving more attention by the day, as an important determinant of our susceptibility to develop many diseases, or our resilience in maintaining health. That ranges from gut-related conditions like inflammatory bowel disease, to obesity, insulin resistance and cognitive function. Understanding microbiota communities, being able to measure their composition and functionality, and even more important, their interaction with the human host, is a factor that NIZO will bring into the discussion when relevant (8). Collections of samples, including fecal (and even small intestinal) material with standardized procedures, and preparing them for the analysis of both the microbiome and a range of gut health biomarkers, is standard practice in most of our clinical trials.
DuPont’s Microbiome Venture Announces Second Strategic Partnership

Three months after its formation, the DuPont Nutrition & Health Microbiome Venture announced its second strategic research and development partnership. The newly forged relationship with the Center of Food and Fermentation Technologies (TFTAK) in Tallinn, Estonia, will focus on developing cultivation and bioprocess capabilities for “next-generation” probiotics.

Last November, DuPont Nutrition & Health (DuPont) announced the creation of its Microbiome Venture to spearhead development of new microbiome science-based solutions. Since then, the Microbiome Venture has already taken significant steps in contributing to DuPont’s business growth strategy. The research and development partnership with TFTAK focuses on cultivation and bioprocess development for “next-generation” probiotics. The term “next generation,” as defined in this partnership, refers to commensal microbes naturally resident in the gastrointestinal tract and demonstrated to be associated with health and wellness. Such microbes typically have fastidious growth requirements, which must be mastered in order to be able to produce them at scale.

“We are delighted to be partnering with TFTAK,” said Microbiome Venture Leader Sebastien Guery. “With its excellent capabilities in bioprocess technology and systems biology, TFTAK will support DuPont by defining the optimum conditions required to culture and produce some of our next-generation probiotic strain candidates.”

DuPont established the Microbiome Venture to accelerate microbiome science-based solution development through a combination of selected strategic partnerships with microbiome science leaders and internal investments. “Our DuPont Nutrition & Health Microbiome Venture partnership will build on our long-term successful cooperation on the development and optimization of production processes for novel bacteria of interest to the dairy industry and potentially to nutrition, health and wellness companies more widely,” said professor Rivo Vilu of TFTAK. “We are looking forward to an exciting next step in our cooperation.”

The Microbiome Venture is a focused entrepreneurial team with a strong connection to the larger DuPont organization, tapping into capabilities including R&D, manufacturing, regulatory, legal and marketing. The Microbiome Venture investment will complement DuPont’s existing product portfolio, especially in the areas of probiotics and prebiotics, including human milk oligosaccharides (HMOs).

About Center of Food and Fermentation Technologies (TFTAK)

TFTAK is a contract research organization based on extensive use of modern analytical (omics) methods, as well as systems biology and synthetic biology principles, aimed at the development and introduction of innovative food and fermentation technologies. Read more at www.tftak.eu/en.

About DuPont Nutrition & Health

DuPont Nutrition & Health, a business unit of DowDuPont Specialty Products Division, combines in-depth knowledge of food and nutrition with current research and expert science to deliver unmatched value to the food, beverage, pharmaceutical and dietary supplement industries. We are innovative solvers, drawing on deep consumer insights and a broad product portfolio to help our customers turn challenges into high-value business opportunities. More information is available at www.food.dupont.com.

About DowDuPont Specialty Products Division

DowDuPont Specialty Products, a division of DowDuPont (NYSE: DWDP), is a global innovation leader with technology-based materials, ingredients and solutions that help transform industries and everyday life. Our employees apply diverse science and expertise to help customers advance their best ideas and deliver essential innovations in key markets including electronics, transportation, building and construction, health and wellness, food and worker safety. DowDuPont intends to separate the Specialty Products Division into an independent, publicly traded company. More information can be found www.dow-dupont.com.
Shedding New Light on your Breakfast

...using laser diffraction for particle sizing in food

Relevant for: Particle Size Analyzer, Laser Diffraction, Food, Milk, Sugar, Coffee

By Nathalie Etchart, Daniel Paul, Carina Burgstaller, Aleksandra Mitrovic

Most food items on the breakfast table are in particulate form at one time or another during their production process, either in powder form or as emulsions. With its ability to measure both liquid and dry dispersions and its wide, nanometer-to-millimeter measuring range, Anton Paar’s Particle Size Analyzer (PSA) is ideally suited to the requirements of production and quality control in the food industry. Wake up to the benefits of laser diffraction by looking at a few of its foodstuff applications.

1 Introduction

Particle size in foodstuff not only affects most aspects of the production process, such as transport, storage or shelf life, but also crucially influences organoleptic properties, such as taste and mouthfeel. Here we look at a few selected food industry applications using Anton Paar’s Particle Size Analyzer (PSA), which measures particle size by laser diffraction technology.

Laser diffraction is based on the observation that the angle of light diffracted by a particle bears a direct correspondence to its size. The size of the particle and the angle of the diffracted light have an inversely proportional relationship, i.e., the angle decreases as particle size increases. In the PSA, dispersed particles (in dry or in liquid form) are directed towards a laser beam, which gets diffracted by them. The resulting laser diffraction pattern is then analyzed by a mathematical model, producing a particle size distribution.

2 Milk: Know the Particles, Know the Quality

Milk is an emulsion of butterfat droplets within an aqueous solution of carbohydrates, minerals and several proteins, the most abundant being casein.

Casein forms micelles in solution, which vary in diameter from about 100 to 200 nm, while butterfat droplets are mostly in the micrometer size range. The size of these particles can vary, which strongly affects the milk’s mouthfeel as well as its colloidal stability.

Here we used the PSA in liquid mode to compare the size of particles in commercial whole milk preserved by different methods. Fresh pasteurized milk was compared to ESL (Extended Shelf-Life) milk and to UHT (Ultra High Temperature) milk.

As shown in Figure 1, the particle size distributions for pasteurized and ESL milk displayed a single peak, indicating a relatively homogenous particle size. The mean diameter was 1.66 µm for the pasteurized milk, suggesting that the butterfat droplets dominated the distribution. The mean particle size was only very marginally decreased in ESL milk (1.58 µm). In contrast, mean particle size was significantly lower in UHT milk (1.2 µm) while the span, which gives a measure of the broadness of the distribution, was enhanced compared to pasteurized and ESL milk. This indicated that the butterfat droplets in UHT milk have been broken down by the heat treatment and that the resulting emulsion was more heterogeneous than pasteurized milk.

In all, the results suggested that, compared to pasteurization, the ESL treatment only very marginally modified the organoleptic properties of milk. This was not the case for the UHT treatment which strongly modified the size distribution and, presumably, also the taste and mouthfeel of the product.

3 Coffee: The Right Grind Makes the Good Cup

It does not take a professional barista to know that the particle size of ground coffee, together with the brewing method, crucially influences the final taste of the infusion. Grinding must be perfectly adapted to each brewing method and, for industrially ground coffee, the size of particles must be tightly monitored.

While filter coffee brews slowly and benefits from a coarse grind, espresso coffee, which is brewed quickly and under pressure, requires a finer grind. The fine grind exposes more particle surface to the hot water and enables a quicker flavor extraction. However, very fine particles tend to release bitter flavors, and oppose more resistance to the water flow. Therefore, a homogeneous (monomodal) size distribution is desirable for most brewing methods, while a mixture of large and small coffee particles must be avoided.

Here we show the results of a ground coffee sample destined for filter brewing. The sample was dispersed in dry form using the PSA’s Venturi system, under low air pressure (500 mb). As shown in Figure 2, the coffee sample displayed a clearly monomodal size distribution, with a D50 value (i.e., median size of the particles) of 836 µm. This corresponded to the coarse grind expected for filter coffee. The low span value (0.9) confirmed the narrowness of the distribution and the monomodal nature of the sample.

Together, the large and highly homogeneous particle size and the apparent lack of small particles suggest that the sample is of good quality and well suited to the filter brewing method.

4 Sugar: The Delicate Delicacy

The most commonly used form of sugar in the kitchen is sucrose, a disaccharide of glucose and fructose. It is found in the tissues of most plants but is overwhelmingly produced from sugar cane and beetroot. Extraction takes place in liquid form, and after refinement and evaporation, crystalization is induced in the supersaturated syrup by the introduction of sugar crystals. The resulting product, termed granulated sugar, has a particle size in the lower millimeter range which is strongly influenced by the different manufacturing steps.

Finer forms of sugar are also required for many baking applications. Crystaline sugar, or fine granulated sugar, is produced by pulverizing granulated sugar to reduce the particle size. Powdered (or icing) sugar is the finest form of commercial sugar and is produced by milling granulated sugar.

The close monitoring of particle size during sugar production is therefore of paramount importance, and the PSA is an ideal candidate for the task. One of the advantages of the PSA is its ability to disperse powder samples using two distinct methods. In the so-called Venturi mode, the powder is fed into a compressed air chamber and ejected through a Venturi tube at a controlled pressure, which can be set by the user between 100 and 6000 millibars. For particles larger than 300 µm, the free-fall mode can be used as an alternative to the Venturi mode.

We measured a commercial powdered sugar sample, which had an expected particle size below 100 µm, using the Venturi dispersion mode. We determined the minimal pressure capable of generating an adequate dispersion to be 500 mb. As shown in Figure 3 (upper panel), the median particle size using these conditions was 33 µm, with a span value of 2.55 indicative of a relatively broad distribution. Increasing the air pressure to 2000 mb significantly decreased the median particle size (20.6 µm) while increasing the span (3.5), clearly indicating that the high pressure led to a breakage of sugar particles.

Figure 1: Volume-weighted particle size distributions of pasteurized, ESL and UHT whole milk samples. Results are expressed as mean diameter (µm) and span, which is calculated as (D90 – D10)/D50.

Figure 2: Volume-weighted particle size distribution (grey bars) and undersize (red curve) of ground filter coffee. The dry sample was dispersed under low pressure air flow.

Figure 3: Volume-based particle size distributions (grey bars) and undersize (red curve) of powdered sugar dispersed by Venturi system at 500 or 2000 mb.
Healthier foods and beverages with great taste - not more and not less - is the basis of a novel cooperation model designed by three renowned firms: the bioeconomy company BRAIN AG, the natural product specialist AnalytiCon Discovery GmbH, and Roquette, the global leader in innovative plant-based ingredients for Food, Nutrition and Health markets. The DOLCE partnership was created to develop innovative, natural-based sweeteners to reduce sugar on a global scale. By joining forces and leveraging research and development expertise with first-class manufacturing abilities, the team brings novel sweetener solutions to consumer product goods companies, across all categories.

There clearly exists a huge need as well as significant market potential in the field of natural-based sweetening solutions. Within the framework of the “Natural Life Excellence Network 2020” strategic innovation alliance, which is a coordinated program by BRAIN and supported by the German Federal Ministry of Education and Research (BMBF), BRAIN and Martin Luther University Halle-Wittenberg (MLU) researched the link between sugar consumption and the prevalence of dental decay, parodontitis and the loss of teeth last year. The study showed that globally acquired treatment costs due to excessive sugar consumption amount to USD 172 billion annually.

Accordingly, numerous political initiatives have been created in order to support the development and production of healthier foods to address all the sugar-related medical consequences and staggering obesity epidemic. Some countries have already introduced levies on high-calorie products and added sugars. Most recently, the UK government established a “sugar tax”. Against this backdrop, it can be assumed that demand for healthier foods and natural ingredients which improve the flavor profile of foods will increase significantly.

Almost all current calorie-reduced sweeteners are coming from synthesis and must be accordingly labelled. Stevia was amongst the first natural examples. But what still prevents the wider use of stevia are the secondary flavors that consumers describe as “tasting like licorice” or “bitter”. The DOLCE program was specifically created to address this unmet need in the marketplace for a novel, innovative and natural-based sweetener, which exceeds the sugar reduction goals and strategies of manufacturers while delivering great taste.

The BioArchive Advantage - a DOLCE Asset

For two main reasons, the DOLCE Team is in a unique position to provide natural alternatives in the natural sweeteners and sweet enhancers, with high quality taste traits. First, as part of the BRAIN Group’s BioArchive Group, AnalytiCon Discovery is in possession of a collection comprising several tens of thousands of natural substances whose structures have already been analyzed. To our knowledge, this is the largest collection worldwide. The unique attribute about this collection, is that many of the substances were isolated from edible plants and are therefore most-likely eligible for GRAS (generally recognized as safe) status, shortening the time to market.

Advancements within this technology resulted in the development of diverse cell lines which constantly provide new insights into taste reception and having great potential to identify novel taste modulators e.g. for sweet, bitter, salty or fat taste. Thanks to these cell models which are cultivated in vitro, researchers at BRAIN are now able to identify new ingredients for the formulation of low-calorie foods with a lower content of sugar and salt at an early stage of the substance selection process. The technology allows for a qualitatively reliable and considerably faster sampling of natural substances than with test subjects in a sensory panel. In addition, the method results in a substantially higher throughput, and the selection step can be taken without submitting the natural substances to tolerability testing beforehand. The low material requirements also mean that it is possible to screen the smallest amounts of natural substances quickly.

Scientists at BRAIN have established and patented a method to obtain long-living primary human taste cell lines providing the identification of novel taste modulators.

The DOLCE Program: Novel sweetening solutions

The DOLCE partnership was created to design the next generation of complementary natural-based sweetening solutions for healthier food and beverages. CPGCs can become members of the ongoing and successful DOLCE partnership for the development of plant-based sweeteners and sweet taste enhancers for diverse applications. Members across many categories have already joined to take advantage of the sweet solutions and successful candidates which are currently under evaluation with food and beverage manufacturers.

Industry leaders in health & wellness

...join forces to deliver novel sweet solutions for sugar reduction in foods & beverages

By Nicolas Descamps (Roquette Frères, France), Dr Katja Riedel (BRAIN AG, Germany), Dr Karsten Siems (AnalytiCon Discovery, Germany)

AnalytiCon has specialized in natural substances since the 1980s and has continuously expanded the collection since that time. Based on this collection, we can take rational approaches and evaluate plants that have been historically or empirically considered for seasoning or which we know to have taste sweet profiles. They process these, isolate the corresponding substance and if it is novel, it’s patented. In the case of sugar-reduction they have already identified numerous substances, which is offered only through the DOLCE program and is known as The DOLCE “SweetBox,” with candidates which are multiple times sweeter than sugar and impressing both our internal tasters and external tasting teams.

Unique Human Taste Cell Technology - a DOLCE Industry-Solution

Secondly, for the DOLCE program and to avoid being solely dependent on source materials from plants that are known to be tasty, BRAIN developed its own Human Taste Cell (HTC) Technology. With cell based models we can mimic human taste perception to identify taste modulators. Using the native taste signaling pathways of tongue cells they were able to identify taste modulators, e.g. saltiness enhancers or bitterness masking naturals. In general, human taste cells are short-lived cells which hardly proliferate in vitro. Before they established in house HTC technology, it was not possible to use human tongue derived cells as a model, due to the lack of homogenous, proliferating cell lines with defined properties, which is a prerequisite to establish comprehensive research and screening programs. BRAIN scientists however have invented, established and patented a method to obtain long-living cell lines derived from fungilorn taste papilae of the human tongue. This research took about 3 years. The patent application on a resulting cell line was filed in 2013. The patent for the US was granted in 2016 and for Europe, the patent was granted at the beginning of 2018.
In March 2018, the partners announced that as a result of their joint efforts - the DOLCE core team partners have identified and characterized first natural-based sucrose sweet taste enhancers and natural-based high intensity sweeteners. More than 25 promising candidates have been selected. These novel compounds are currently under evaluation with the members, which have joined the DOLCE partnership. They are allowed to test the plant-based sweetening solutions within their specific product matrices for their own food and beverage product portfolio, with the goal to secure the best fit. The DOLCE partnership started in August 2016. Since then, the DOLCE Team continues to be approached by the largest consumer products companies in the world, across all food and beverage sectors to obtain membership in this unique and successful, industry-wide program.

For additional information on joining the DOLCE program, please contact Dr. Martin Langer, EVP Corporate Development at BRAIN, Tel.: +49-6251-9331-16, E-Mail: ml@brain-biotech.de.

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PB Gelatins/PB Leiner to present innovative collagen product concepts at Vitafoods 2018

At Vitafoods 2018, PB Gelatins/PB Leiner will be showcasing various different innovative product concepts including on-the-go stick packs, beauty collagen drinks, as well as a collagen whey protein shake. All of these product concepts contain PB Gelatins/PB Leiner’s latest premium SOLUGEL® collagen creation. These collagen peptide products are very neutral in regard to both odor and flavor, which in turn allows maximum creativity in formulation creation. They can be easily dissolved into liquid thanks to the agglomerated powder nature. Furthermore, excellent organoleptic performance as well as their outstanding nutritional value make SOLUGEL® the perfect ingredient for innovative formulations of healthy products.

PB Gelatins/PB Leiner will be exhibiting at booth A34.

Contributing to a healthy lifestyle

Consumer trends such as healthy aging, protein fortification, beauty and medical nutrition, as well as sports nutrition, have ensured a strong growth in the collagen peptides market on a global level over the past few years. And collagen has unquestionably been recognized as one of the leading health ingredients in these sectors by an increasingly broader audience. In addition, collagen is increasingly seen as being a critical component that people have been omitting in their diets due to a change of eating habits in the modern world as compared to previous generations. Representing the concept of a healthy lifestyle, collagen is the shining star in the natural product sector.

And these trends will continue to influence the markets and stimulate growth in the future. In order to successfully respond to these trends and to make it even easier for our customers to grasp these opportunities, PB Gelatins/PB Leiner has developed some innovative product concepts that will be available for tasting at Vitafoods: a beauty collagen drink, a collagen whey protein shake and on-the-go stick packs.

PB Gelatins/PB Leiner’s beauty collagen drink boosts one’s beauty from within: a recent clinical study showed that the oral intake of 10 g SOLUGEL® significantly improves the moisturizing effects, skin net elasticity and firmness of the skin after 56 days. PB Gelatins/PB Leiner’s beauty drink with bioactive SOLUGEL® Ultra BD collagen peptides offers the ideal natural solution for skin aging.

As collagen is also a key component of joints, cartilages, ligaments and tendons, it helps to prevent injuries and speeds up recovery times following sporting activities. Furthermore, thanks to PB Gelatins/PB Leiner’s SOLUGEL® products it is now possible for food manufacturers to further strengthen their sports formulations with collagen. Our innovative collagen whey protein shake, which contains premium blends of SOLUGEL® Ultra B collagen and whey protein in order to enhance sporting performance and to protect joints, will be available for tasting at Vitafoods.

Research has shown that protein shakes are often consumed as a meal replacement for busy, yet health-conscious consumers. This blend contains minerals, vitamins and dietary fiber, which makes it a great partial meal replacement product. In addition, consumers can benefit from the long lasting satiety effects that SOLUGEL® brings. A clinical study has shown that an intake of 15 g of SOLUGEL® collagen protein brings long lasting satiety and is ideal for a healthy and balanced diet.

Finally, the convenient format of pure collagen on-the-go stick packs will also be available for tasting. As our premium product offer, SOLUGEL® Ultra BD tastes extremely neutral and is easy to dissolve in any choice of liquid. On-the-go stick packs enable consumers to enjoy their daily collagen dose wherever and however they want.

SOLUGEL® - the ideal ingredient for your food and drink applications

Collagen is the most abundant protein in the human body and it accounts for over 30% of the body’s protein and key building blocks that provide support and structure to the body. Several clinical studies have proven the health benefits of collagen peptides.

As a leading global player, PB Gelatins/PB Leiner provides a complete range of high quality collagen peptides under the SOLUGEL® brand name. Our latest premium product offering - the SOLUGEL® BD SERIES - consists of a range of agglomerated collagen peptides with characteristics that reduce the risks of dust and/or lump formation to the greatest extent possible when dissolving. This makes them an ideal ingredient for applications in which instant solubility is a key factor. In addition, we will also be proudly presenting our SOLUGEL® Ultra B, which is a fine powder collagen product with excellent organoleptic properties. Such properties are ideal for the creation of homogenous blends where the majority of the powder is fine.

As collagen peptides, SOLUGEL® also offers a wide variety of nutritional benefits. With a protein content of over 91%, they are an excellent candidate for boosting the volume of protein in food applications. They are natural products from a single source, can be based on different raw materials, including halal and kosher products, and are free from any preservatives, artificial colors, flavors, gluten, sweeteners or any other additives. They are also extremely neutral in regard to both odor and flavor and can be easily formulated into any recipe with a very limited impact on the smell and taste. Therefore, they contribute to clean label innovations by reducing the use of aroma and flavor ingredients.

About PB Gelatins/PB Leiner

PB Gelatins/PB Leiner is an established global player with production sites in Asia, Europe, North America and South America. PB Gelatins/PB Leiner supplies a complete range of high quality gelatins and collagen peptides, tailoring solutions to its customers’ applications. PB Gelatins/PB Leiner was the first gelatin producer to introduce cold-soluble gelatin products to the market, increasing its range of specialties to offer a more convenient gelatin-based solution that provides significant advantages in terms of saving time, increasing flexibility and reducing cost-in-use. PB Gelatins/PB Leiner employs approximately 1,200 people and is part of Tessenderlo Group.
The daily ingestion of natural astaxanthin is highly advisable to maintain physical and mental fitness. The scientifically backed antioxidant benefits muscles, cognitive function and mitochondrial energy management.

Top research ingredient and quality product

There are in excess of 400 peer-reviewed studies on astaxanthin. What’s more, natural astaxanthin from AstaReal® has been used in nearly 60 human clinical trials with 1400 plus participants. AstaReal is a pioneer in the cultivation of the microalgae from which the valuable antioxidant is derived. The cultivation process the company has in place features the tightest controls in the industry and yields an ingredient with outstanding purity, stability and with the most rigorous specifications. Not all natural astaxanthin is created equal. Unlike other companies that manufacture astaxanthin from Haematococcus pluvialis alga, AstaReal eschewed the open pond and other outdoor cultivation methods, due to them being susceptible to contamination. Thus, the company cultivates and processes its algae completely indoors under controlled conditions in specially designed photobioreactors, resulting in a product that both sets and exceeds market standards.

For nutritional supplements and functional food, the final biomass powder is developed with outstanding purity, stability and with the most rigorous specifications. Not all natural astaxanthin is created equal. AstaReal is a pioneer in the cultivation of the microalgae from which the valuable antioxidant is derived. The cultivation process the company has in place features the tightest controls in the industry and yields an ingredient with outstanding purity, stability and with the most rigorous specifications. Not all natural astaxanthin is created equal. Unlike other companies that manufacture astaxanthin from Haematococcus pluvialis alga, AstaReal eschewed the open pond and other outdoor cultivation methods, due to them being susceptible to contamination. Thus, the company cultivates and processes its algae completely indoors under controlled conditions in specially designed photobioreactors, resulting in a product that both sets and exceeds market standards.

Moreover, the company develops customised astaxanthin formulations that are suitable for various dosage forms and application vectors – from fatigue, muscle endurance and recovery, to cardiovascular, brain, eye and skin health.

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The popularity of protein rich diets has prompted sustained efforts to identify new sources— but understanding the characteristics of these alternative ingredients is essential for successful product formulation and consumer acceptance. Carole Bingley, Technical Specialist for Reading Scientific Services Ltd (RSSL), reviews some of the latest developments.

Consumer perception of protein is undergoing a transformation. Over recent years, health and environmental concerns around animal protein consumption has prompted a rapid rise in flexitarian, vegan and vegetarian diets, as well as a renewed focus on plant-based alternatives. For food and drink manufacturers, this represents a clear opportunity—plant based proteins, for example, now represent a renewed focus on plant-based alternatives.

Concerns around animal protein consumption has prompted a consumer perception of protein is undergoing a transformation. Over recent years, health and environmental concerns around animal protein consumption has prompted a rapid rise in flexitarian, vegan and vegetarian diets, as well as a renewed focus on plant-based alternatives. For food and drink manufacturers, this represents a clear opportunity—plant based proteins, for example, now represent a renewed focus on plant-based alternatives.

Retention of nutritional value of vegetable proteins

As with all product development, taste is a priority when it comes to vegetable proteins. It is a challenging process but, working with flavour houses to mask the less desirable notes can be a route to deliver positive results; with different flavours evaluated and blended to create the optimal taste profile.

With regards to vegetable protein-based crisps, the extrusion process used to produce them can help to improve the flavour. The added advantage of these ingredients is that they also add a crispy ‘granola type’ crunch to breakfast cereals and are particularly useful in snack bars which, if made with conventional protein powders, risk being quite dense, chewy and heavy. And while this may not be such a problem for dedicated sports enthusiasts, for a mainstream audience it is not only a challenge but a barrier to purchase.

So too is sedimentation in beverages, which is a particular drawback of using vegetable sources to boost protein in beverages. But again, there are methods to address their poor solubility. Adjusting the pH, reducing the particle size or the processing of the protein in a different way can all help to resolve it. Addition of stabilisers can help to suspend protein particles. Addition of stabilisers can help to suspend protein particles. Alternatively, a research direction may also be reached by screening a number of different proteins to identify the best source or blend on a case-by-case basis.

Beyond meat

One category that has been grabbing the media headlines recently is the so called ‘meat free burger’. Together with the US-produced Impossible Burger and Beyond Burger, the recent launch of Moving Mountains B12 Burger in London’s vegetarian and vegan restaurant Mildred’s marks a clear move to deliver the same look, taste and texture. Interestingly, this is in contrast to more established meat substitutes. Quorn, for example, appears to be less concerned with replicating the exact look of meat and much more focused on conveying positive messaging around health, environment and an enjoyable eating experience.

So what is striking about these vegetable-based products is that they are going head-to-head with the traditional burger—arguably the core of a meat-eater’s diet— and demonstrating a new way of thinking about formulation with alternative proteins.

Re-creating the fibrous texture of meat is key and ingredient suppliers are doing a lot of work to improve the performance of vegetable proteins in this respect. Blending different vegetable proteins can be useful when trying replicate the bite and succulence of meat.

Certainly in these first commercial products, these general principles appear to have been translated effectively. The Beyond Burger uses just one source of pea protein, whereas the other two products take a blended approach; namely, wheat, potato and soya protein in the Impossible Burger, while the Moving Mountains B12 Burger features a combination of pea, wheat and soya protein. Equally important, however, is the visual appeal of these products and careful ingredient additions help to replicate the expected pink colour of beef; the Moving Mountains B12 Burger, for example, uses beetroot in an attempt to mimic the burger ‘bleed’.

Animal options

Alongside the strong push to develop plant-based options, work is also ongoing to explore viable new animal options. Despite facing major consumer acceptance issues in some quarters, the need to find more sustainable solutions to feed an ever-expanding global population continues to drive these developments.

In this category, insect protein does seem to be gaining traction in some quarters, as well as widespread press attention. As an ingredient, it is a complete protein with a good amino acid profile and relatively high protein levels—crickets, for example, are 60-70% protein. These positive attributes have helped encourage producers to push traditional boundaries and create new snack products which are now available across Europe in select online and high-end retailers.

Exactly how successful this emerging category will prove to be in the long term remains to be seen. In practical terms, as you would expect, there are a number of issues to take into account. First of all, regulatory discussions are ongoing with the European Commission regarding Novel Foods in relation to purified insect protein. Currently, you cannot extract the protein as that is not the format for cultivated meat which, although significantly more popular, is still in its relative infancy.

The challenges the industry is facing to develop consumer acceptable protein rich foods and to use a wider selection of vegetable protein sources in products are all challenges that the RSSL product development team are supporting industry with.

About Carole Bingley

Carole is a Senior Associate Principal Scientific Working in the Product and Ingredient Innovation Team at RSSL. She holds a Bachelor of Science in Food Science and a Master of Science in Nutritional Medicine. Carole has worked in product development and ingredient evaluation across many food categories during her 25 years in the food industry.

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What is Roman chamomile? 
Roman chamomile, more formally known as Chamaemelum nobile (L.) All., is one of the oldest known medicinal herbs and has historically been a widely grown species of the daisy family [1]. It is indigenous to Western Europe but can be found growing wild or cultivated all over European, North African and Southwest Asian countries [2, 3]. Over the past few years, its occurrence has declined, due to adverse weather and growing conditions, to the extent it is now considered an endangered species [2]. Its flowers are found in two different botanical varieties, the single and the double, however the commercially grown herbal substance comes from the sterile doubled-headed flowers [1, 3, 4]. They usually flower from June to September, giving off a very pleasant, apple-like scent [3]. This unique fragrance is also the reason why this plant was named as “chamomile”, coming from the Greek words “chamos” meaning ground and “melos” meaning apple.

Although Roman chamomile is mainly used as a lawn, it has many therapeutic, cosmetic and food applications, due to its splendid safety profile [3]. It has been shown to possess a wide range of pharmacological effects, including anti-inflammatory, antioxidant, antibacterial, anti-emetic, antispasmodic and relaxing activity [5, 6, 7, 8]. Roman chamomile has been used for over two thousand years, both internally to treat gastrointestinal and digestive ailments and externally to heal skin, mouth and respiratory inflammation, as well as eye irritation [6, 9, 10]. It has also been applied anecdotally to relieve mild premenstrual symptoms, allergies, hay fever and asthma [4, 11]. In the food industry, Roman chamomile is often consumed as herbal tea, as well as employed as a flavouring agent to various food and drink preparations, being rich in carbohydrates and proteins and low in fats [8].

What’s the difference from German Chamomile? 
Roman chamomile is very often confused with the now more well-known German chamomile (Matricaria chamomilla L.) [1]. However, Roman chamomile is considered to have superior therapeutic effects than those of German chamomile, and therefore it was named as “nobile”, meaning noble [3]. Apart from some common applications, the differences between the two species outweigh the similarities.

Regarding morphology, commercially grown Roman chamomile is a small, non-seed producing, perennial plant with a hairy stem and double-headed, white flowers, which are larger than those of the German chamomile. Its propagation is vegetative through plant division. German chamomile, on the other hand, is a seed-producing, annual herb that typically reaches a height of 60 cm and has a hairless stem [4]. Although many common compounds have been identified in both plant types, there are several differences in their chemical composition. Roman chamomile is primarily composed of terpenoids, flavonoids - mainly luteolin, quercetin, apigenin and its derivative chamaemeloside, and catechins, coumarins, phenolic acids and esters [9, 12]. Its volatile oil, is yellow in colour and presents the highest concentration of esters compared to all known essential oils, with angelic and trigic
Chamomile, we have tested the gene expression responses of young adult C. elegans worms treated with the herbal extract. Now [16], Sibelius screened diverse chamomile extracts to identify their possible beneficial effects on the regulation of cellular ageing. Sibelius®: Chamomile, was a set of C-type lectins, which have anti-inflammatory properties in animal models. 

As shown above, there is a noteworthy morphological and chemical variation between these two types of chamomile, which subsequently provides different pharmacological effects and applications to each plant. German chamomile is the most commonly used herb in all chamomile preparations, but what if Roman chamomile provides enhanced effects? With recent studies reporting on the unique properties of Roman chamomile, the value of this plant is constantly growing [1].

Sibelius®: Chamomile

Considering the above, Sibelius has explored in depth the beneficial effects of Roman chamomile and is now ready to introduce its second botanical extract Sibelius®: Chamomile. This follows Sibelius®: Sage, which has already achieved great success worldwide [15]. Sibelius®: Chamomile is a unique ingredient, derived from a non-pollen producing, specific cultivar of Roman chamomile grown in the UK. By taking advantage of our proprietary Chronosun™ technology described in Part 1 of Nutraceuticals Now [16], Sibelius screened diverse chamomile extracts to identify their possible beneficial effects on the regulation of cellular ageing [17]. This study shows significant increases in lifespan of the model organism, C- elegans by over 10% (Figure 1). To further understand the activity of Sibelius®: Chamomile, we have examined responses of young adult C. elegans worms treated with the herbal extract. Amongst the genes that were up-regulated in response to Sibelius®: Chamomile was a set of C-type lectins, which have activities including the activation of immune responses [17]. Also, up-regulated was a set of genes involved in sphingolipid metabolism, which also has implications for innate immune and inflammatory responses - amongst other things – through both physiological and signalling mechanisms. Sphingolipids are important constituents of lipid rafts, which are highly organised assemblies of lipids and proteins that are present in cellular membranes and play important roles in processes such as signalling and trafficking. Of potential interest in the case of Sibelius®: Chamomile is that lipid rafts have been implicated in inflammatory responses, such as allergic rhinitis, through the modulation of mast cell degranulation and histamine release. Interestingly Sibelius®: Chamomile treatment down-regulated the expression of a number innate immune response genes that are normally located in these lipid rafts, suggesting that the herbal extract may play a role in the modulation of inflammatory and immune responses via modulating the number and/or activity of lipid rafts. Together, the expression data provides insights into the activity of Sibelius®: Chamomile that is consistent with the anti-inflammatory and immune suppressing properties traditionally associated with medicinal applications of the herb.

Sibelius research has revealed new and interesting data about the effects of Sibelius®: Chamomile on the immune system. However, the underlying mechanism of this activity, and how this might contribute to beneficial effects for allergic diseases are subject to future research. Currently the molecular functions of herbal extracts using the above-mentioned approach does not provide all the answers, but it undoubtedly helps to know the right questions to ask at Sibelius, so as to direct our research and development efforts in the future.

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Cardiovascular diseases (CVDs): the leading cause of death worldwide

According to data issued by the World Health Organization, cardiovascular diseases (CVDs) are the leading cause of death and disability worldwide, representing a huge drain on public health expenditures. CVDs take the lives of 17.7 million people every year representing 31% of all global deaths. Triggering these diseases – which manifest primarily as heart attacks and strokes – are tobacco use, unhealthy diet, physical inactivity and the harmful use of alcohol. These in turn show up as people raised blood pressure, elevated blood glucose and overweight and obesity, risks detrimental to good heart health [1].

There are no doubts on the key role of diet in a holistic approach to health. Several scientific studies support a strong correlation between diets rich in flavonoids and cardiovascular risk reduction. (2) In particular, Citrus bergamia Risco, also known as bergamot, has been shown to act as an antioxidant/ radical scavenger, thus attracting considerable attention from scientists.

Undoubtedly, high levels of serum cholesterol, triglycerides and LDL are often associated with an increased incidence of atherosclerosis and coronary artery disease. The Heart Association’s recommendations to keep one’s heart healthy include being smoke free, managing blood cholesterol, pressure and diabetics, being physically active, achieving and maintaining a healthy weight, and also enjoying a variety of nutritional food. (3)

Taking care of cardiovascular health, naturally

Botanical extracts have emerged to lend support in this direction with a number of applications in health food market, where edible plants represent a very rich source upon which to build new products. These products are found mainly in the form of stand-alone, highest quality overall, together with clinical research and substantiation, to ensure the maximum safety and efficacy profiles.
nutraceuticals now

and highly effective. This study investigated the activity of 1000mg of the extract administered daily for 30 days showing that the product is safe and effective. This study was carried out to verify the effects of VAZGUARD™ in individuals with dyslipidemia associated with hyperglycemia. A double-blind, randomized, placebo-controlled clinical study has been carried out to verify the effects of VAZGUARD™ in individuals with dyslipidemia associated with hyperglycemia. This study investigated the activity of 1000mg of the extract administered daily for 30 days showing that the product is safe and highly effective.

VAZGUARD™ is effective on the reduction of cardiovascular risk in subjects by modulating total cholesterol (tChol), low-density Lipoproteins (LDL), triglycerides (TG), high-density Lipoproteins (HDL), and blood glucose after just 30-day treatment. Pharmacokinetic studies in rats [9] demonstrate a significant absorption improvement. In particular, rat plasma Cmax and AUC of bergamot flavonoids are near 7-fold over the ones measured with non-formulated bergamot extract. Clinical analysis confirm that VAZGUARD™ can provide. VAZGUARD™ is standardized to contain 15-19% of total bergamot flavanones by HPLC and is supported by clinical studies reinforcing its safety and efficacy profile.

Indena’s extracts: quality, safety, effectiveness

With VAZGUARD™, Indena widens its R&D pipeline, enriching its range of outstanding botanical extracts aimed to maintain cardiovascular health. The safety profile and effectiveness of Indena extracts are supported by several clinical studies, which few other companies can provide in support of their products. The expertise, and this approach to research and innovation, has always been the hallmark of Indena, and has led the company to the production of the highest quality active ingredients of botanical origin for the pharmaceutical, health-food and personal-care sectors.

VAZGUARD™: the science behind

With VAZGUARD™ Indena meets the need of a highly standardized and genuine Bergamot extract with an excellent phytochemical characterization, and a superior bioavailability for a complete solution in the cardiovascular field of use, made with the accuracy and the expertise that only Indena can provide. VAZGUARD™ is standardized to contain 15-19% of total bergamot flavanones by HPLC and is supported by clinical studies reinforcing its safety and efficacy profile.

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Meriva®, the Life Guardian™

Meriva® is the unique formulation of turmeric featuring the Phytosome® biomimetic delivery system inspired by the principle Nature as Measure™, mimicking nature, re-making it with the brain power of researchers by building processes and principles on the bench of a laboratory, a real scientific gem from Indena.

Designed to optimize biodosorption for full effectiveness, safety and tolerability, Meriva® stands as The Life Guardian™ during the entire course of our life.

It sets off the energy of a new historical cycle in which the greatest level of innovation is represented by the intersection between nature and technology.

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Active and Sports Nutrition

... ingredients and dosage forms for professionals and the mass market

By Dominik Mattner, Director Business Development, Consumer Health & Nutrition, Lonza

With an ever-growing market of active consumers – and established audience of sports professionals and weight lifters – the use of active and sports nutrition products is on the rise. According to recent statistics, the global market stood at $28.37 billion in 2016 and is expected to reach a value of $45.27 billion by 2022.1 As more illegal platforms such as sports bodybuilding and health blogs, consumers are becoming increasingly aware of the impact of lifestyle choices on their health, and purchasing behaviors in the active and sports nutrition category are beginning to shift in line with this movement. When it comes to making buying decisions, consumers and professionals alike are more informed about the ingredients used in their products, demanding more from the products they buy.

More and more consumers are endeavoring to adopt a healthy lifestyle, meaning the use of active and sports nutrition products is no longer exclusive to professional athletes and hardcore bodybuilders. The consumption of fortified foods, beverages and supplements making its way into the everyday market. As new audiences, such as weekend warriors and ‘sporty millennials’ are increasingly recognizing the benefits of such products, there is growing pressure for manufacturers to deliver new and innovative supplements that meet a wide range of consumer preferences.

Professional vs. mainstream markets

Across the world, the demand for safe, high quality supplements which deliver science-backed benefits is on the rise. A recent global survey conducted by the Natural Marketing Institute (NMI) and commissioned by Capsugel, now a Lonza company, indicates that the market in Italy has the highest consumption of supplements. In this country, three in four people interviewed are currently using supplements, with more than a third increasing their usage over the last few years.2 In France, 54% of those surveyed currently use supplements, with more than two in five UK consumers aged 16 to 24 citing that they have consumed sports nutrition products in the past three months.6 Although sales are growing at a rapid rate, supplement manufacturers need to not only consider the ingredients they select, but also the dosage form for active and sports nutrition applications. Easy to swallow and convenient, capsules can hold a wide range of multiple incompatible ingredients in one capsule can result in the desired result from supplement intake, a combination of more than one ingredient is needed. However, combining multiple incompatible ingredients in one capsule can result in forming chemical by-products or losing the integrity of sensitive ingredients. To overcome difficult product combinations, supplement manufacturers use advanced technologies, such as DUOCAP™ capsules-in-capsules. Developed by Capsugel, patented DUOCAP™ technology enables liquid and solid actives with different release profiles to be combined in one dosage form, such as vitamin K2, vitamin D and calcium which can be used in one supplement to aid bone health.

Complying with clean label claims

Having made inroads across the food and drink industry, the clean label trend continues to shape the future of the active and sports nutrition market, with many supplement labs now placing a greater focus on clean label claims. As demand for clean label continues to grow, supplement manufacturers need responsibly sourced ingredients and the highest quality processing methods to ensure the maximum benefit of discerning consumers. To support this, Capsugel has developed a number of advanced certified vegetarian and vegan friendly dosage forms, including Vcaps® Plus plant-based capsules that consist of only vegetable and HPMC, vegetarian Lapcius® capsules and Plantcaps® capsules made from Pullulan – naturally fermented from fungus spores. The aim of this is to ensure capsules made from Pullulan – naturally fermented from fungus spores. The aim of this is to ensure ingredients and dosage forms for professionals and the mass market

meet the demand for clean label products and create safe, high-performance sports nutrition supplements for both the professional and mainstream consumer markets.

For more information on Carnipure® L-Carnitine, visit www.carnipure.com

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Vitamin K2 MK-7 Manufacturing: The Future of the K2 Market

Vitamin K2 MK-7 is an essential fat-soluble vitamin. Like vitamins A, D, K1, and E our bodies need it to function properly. First discovered in the 1950s, K2 was mostly forgotten until clinical investigation began in earnest in the early 2000s. The K2 MK-7 market is doubling each year, propelled by bone and heart-health benefits relevant to virtually all consumer types. K2 offers product extension opportunities in top-selling product categories by building awareness and beginning to make its way into mass-market retail channels and the commercial prospecs for K2 are bright.

K2 activates the osteocalcin enzymes that integrate calcium into bone. Without adequate K2, calcium and vitamin D3 can’t function optimally in the body. All three are needed for good bone health and K2 makes this happen by regulating matrix Gla (MGP). These enzymes bind excess calcium in the blood, preventing deposit in the arteries and circulatory system. Calcium, in turn, is the risk factor for cardiovascular disease. K2 has even shown to reverse hardening and restore arterial flexibility, returning the circulatory system to better health [9].

About 30% of K2 ingredient manufacturing is produced by synthesis and the remainder using a fermentation-based method. Synthesis was achieved in 2009, with the first of these products entering the market in 2011. Commercial-scale K2 fermentation was launched slightly earlier, and for several reasons remains the more common method. Both methods have strengths and weaknesses, benefits and trade-offs. On a product-by-product level the choice between ingredients manufactured by each method might be small. As happens in all markets, however, K2 manufacturing will likely consolidate around the technology that provides the most efficient manufacturing and long-term growth.

The K2 Standard

Vitamin K2 (menaquinone), different from vitamin K1 (phylloquinone), represents a family of compounds with isoprenoid side-chains of varying lengths. Side chains consist of 4 to 13 isoprenyl units, designated K4 to K13. EFSA vitamin K approval criteria [1] require that the K1 and K2 MK7 forms, though K8 may be present to a minor extent (EFSA Regulation 1925/2006). While other MK forms are used for dietary supplementation or may be present in K2 products, the presence of other MK forms in a K2 MK-7 product fundamentally represents an impurity.

MK-7 is the most active form of K2 for supplementation. Studies demonstrate that intestinal uptake/absorption of MK forms are different, depending on the length of the sidechain. Synthesis produces MK-7 in higher yield as compared to fermentation. The efficiency of the compounds as measured by their effectiveness in activating osteocalcin and MGP proteins. A 2017 EFSA Scientific Opinion noted that the uptake of MK-4, MK-7 and MK-8 are different [2], and a 2012 study showed that MK7 is better absorbed than MK-4 [3]. Clinical trials also demonstrated that MK-4 and MK-9 are no more effective than MK-7 [4, 5], while MK-8 is shown to be better absorbed than K1 [6, 7]. Based on these studies the EFSA opinion concluded that MK-7 is more effectively absorbed than K1 and MK-8.

Because of MK-7’s superior biological efficacy and EFSA regulatory status, any discussion of K2 manufacturing should begin with MK-7. Original fermentation processes do not deliver equivalent biological benefits, and their intended or unintended presence in K2 products is undesirable.

Synthesis K2 Manufacturing

Synthesis produces MK-7 as a crystalline, all-trans MK-7 molecule, with no other MK forms present. Synthesis achieves isometric purity of 99.7 percent or higher. K2 isomer purity is defined by the United States Pharmacopoeia (USP) as a ratio that does not exceed 2 percent cis isomer (biologically inactive) to trans isomer (biologically active). While 99.7% purity is noteworthy, the K2 market enjoys healthy competition among several manufacturers of high-purity MK-7, including fermentation and KP-derived K2. Purification methods produced by either manufacturing should perform well in mono-K2 products and non-mineral formulations. All high-quality systems can be adapted to the field from known healthy growth of the K2 market in these types of formulations.

The exceptional purity achieved by synthesis, however, does provide an asterisk to the claim. K2 is a fermentation product, so the purity from the US Federal Safety Agency found that when fat-soluble vitamin D is combined with calcium, it can degrade ‘within a month or two.’ Following the market launch of the first K2 plus-calcium products, a similar problem was discovered. Testing demonstrated that these first K2 plus-minerals products were not shake-stable. Even the highest-quality K2 MK-7 proved unstable when combined with medicines like calcium or magnesium.

Microencapsulation was the solution. Protection of the molecule prevents degradation or oxidation when MK-7 is formulated with incompatible co-ingredients. While isometric purity is an efficient tool for K2 supplement manufacturing, microencapsulation manufacturing requires a starting point of 100% purity. Therefore, synthesis enables microencapsulation, and microencapsulation supports synthesis by creating a wider range of product formulations (targeting a broader consumer base). By comparison, pure and product-ready fermented K2 MK-7 is an expensive test product that requires additional steps to enable the patented spray-dry double-encapsulation process (adding to the cost-basis of the final product).

Finally, synthesis addresses the commercial parameters required for a dietary supplement to evolve from niche category to mass market. About 30% of K2 ingredient manufacturing is produced by fermentation, but not enough to meet daily requirements. K2 should be available in all product categories -- and fermentation methods often have differing capabilities for transparency and documentation by K2 manufacturers, ingredient purchasers. Equally they demonstrate the need for due-diligence on the part of K2 manufacturers, and support for third-party quality testing using USP accepted methodologies.

Another benefit of fermented MK-7 is that it is sometimes marketed as, or is associated with, the word ‘natural.’ Fermentation K2 manufacturing starts with a raw carbohydrate production process as synthesis – processes typical for any large-scale ingredient manufacturing. Commercial K2 MK-7 is not extracted from nature. It must be artificially manufactured using one production method or another.

Large-scale laboratory fermentation includes steps to isolate microorganisms, grow the MK-7 that occurs as it occurs in nature is significantly lower. Chemicals like sodium hydroxide, dextrose and glycerol are added to the fermentation broth. Fermentation production process also includes the use of solvents. These are used to extract MK-7 from an oily phase in the fermentation production process. One liter of fermentation broth yields about 1 gram of biomass, of which about 1.5% is the MK group – consisting primarily of MK-7, but also including MK-6, 8, and 9. A high-purity product is required to produce 98% or 99% bioactive MK7 (biologically active) MK-7. A low-quality manufacturer may produce as little as 30% trans MK-7. Solvents are then used to remove these impurities from the biomass, with the result that the outcome meeting 99% all-trans MK-7 plus minor amounts of MK-8.

Large-scale laboratory procedures and use of solvents likely put a ‘natural’ categorization out of reach for K2 manufactured via fermentation. While there is no statutory definition of a ‘natural’ product, many brands use this term to define themselves in the context of advertising (specifically regarding a ban on misleading information). For these purposes, a ‘natural’ category may include MK-7 that will not perform well in mono-K2 and non-mineral formulations, which in turn expands market opportunities for K2. Synthesis supports the scalability, supply chain and price requirements to bring K2-plus-minerals into mass markets. Synthesis and fermentation-produced MK-7 are bioequivalent, and both methods have contributed to the early-stage development of K2. As MK-7 becomes more familiar to ‘niche’ status and move fully into mass markets and widespread consumer adoption.

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By Jim Beakey, Kappa Bioscience

Vitamin K2 Kappa Bioscience AS, Market Study: K2 Stability

Algatech Launches Whole Algae Benefits in a Tablet

Algatechnologies Ltd. (Algatech) will launch its innovative AstaPure® Arava whole-algae tablets for private label customers. This is astaxanthin as created by nature, containing all the naturally occurring constituents such as omega-3s, fibers, proteins and phospholipids that contribute to bioavailability. This advanced product is manufactured using ESL™ Technology, Algatech’s proprietary method that gently preserves the algae composition and allows for excellent stability of the natural astaxanthin in tablet form.

AstaPure Arava whole-algae is a superfood and aligns with the market demand for clean label, sustainable, minimally processed ingredients.

Algatech also will highlight its new, organic, non-GMO AstaPure® astaxanthin at the show. Algatech cultivates microalgae in a patented, eco-friendly, closed system that guarantees the production of safe, pure ingredients and minimizes the environmental footprint.

The company works relentlessly to unlock the nutraceutical potentials of microalgae, discovering and industrializing new strains and producing it in large scale through methods completely beneficial to both consumers and the planet.

Visit us at Vitafoods booth no. K134

VITABIOTICS BECOMES THE FIRST VITAMIN COMPANY IN HISTORY TO RECEIVE THE QUEEN’S AWARD FOR INNOVATION FOR THE SECOND TIME

Today, 21st April 2018, Vitabiotics, the UK’s number one vitamin company, is honoured to announce The Queen’s Award for Enterprise in Innovation has been awarded to its Perfectil beauty vitamins range. This is the first and only time that a vitamin company has received the award for innovation on two occasions. It marks the fourth Queen’s Award that Vitabiotics has received, including The Queen’s Award for Enterprise in Innovation for its Pregnacare vitamin research in 2013

Vitabiotics Perfectil is the UK’s number one nutritional supplement for skin, hair, and nails. It represents multiple innovations in the field of cosmetic science and nutrition, underpinned by a portfolio of granted and filed patents, as well as being the first choice of beauty experts and celebrities including Nicole Scherzinger.

A groundbreaking Perfectil clinical trial showed for the first time that supplementation can help to protect against the ageing effects of harsh winter weather on the skin. The pioneering work led to Vitabiotics’ founder and chairman Dr Kartar Lalvani OBE receiving an honorary professorship from the University of Franche-Comté. This was the first time the award of professorship was given by the University to a British scientist in the field of dermatology.

Commenting on the new Queen’s Award, Vitabiotics President Dr Kartar Lalvani OBE said: “Vitabiotics is immensely honoured to once again receive the Queen’s Award for Innovation, in recognition of our unique and highly successful Perfectil research and innovation. This accolade is a testament to Vitabiotics and I would like to thank all of our dedicated staff, customers, suppliers and research partners for their continued support.”

Vitabiotics’ CEO Tej Lalvani said: “Over the last 45 years, Vitabiotics has consistently been at the cutting edge of nutritional thinking, translating emerging science into effective products, and has established a greater range of new original clinical research, as background support to its formulations, than any other vitamin company. We are all incredibly proud to have once again received this most prestigious award.”

REFERENCE

1 Research conducted at the renowned international centre for dermatological and cosmetic research, University Hospital of St Jacques, Besançon, France, one of the oldest hospitals in the world, dating back to 1182. Efficacy of micronutrient supplementation [Perfectil Platinum] on skin aging and seasonal variation: a randomized, placebo-controlled, double-blind study. Clinical Interventions in Aging, November 2013

DSM invites visitors to discover the nutrition of the future at Vitafoods 2018

DSM, stand F10, Vitafoods Europe, Geneva, 15-17 May 2018

DSM will welcome attendees to experience the nutrition of the future at Vitafoods Europe 2018, with insights and innovations that will enable customers to capture the opportunities changing the face of the industry. At booth F10, DSM will showcase its capabilities in personalized nutrition, while visitors can experience new scientifically-proven, consumer-tested delivery formats. Highlighting its broader range of novel nutraceutical ingredients, experts will demonstrate how DSM can enable businesses to do more with nutrition by addressing individual consumer health needs.

Personalized nutrition is based on fast, accurate measurements, and at this year’s show delegates will be able to assess their own health status using a variety of devices at DSM’s booth and choose the solution best matching their requirements at the on-stand tasting bar. Customers can also learn more about how they can benefit from DSM’s scientific expertise and ability to connect organizations across the supply chain, to capitalize on the demand for a more targeted approach to nutrition.

DSM has taken a pioneering new approach to address the rise in consumer ‘pill fatigue’, collaborating with designers worldwide to develop the supplements of the future. As part of the global project, individuals were invited to submit ideas for novel delivery format concepts, which were then brought to life by DSM following extensive consumer testing. A selection of these next generation prototypes will be unveiled at the show, where attendees can sample and vote on their favorite.

Also under the spotlight this year will be a selection of DSM’s innovative nutraceutical ingredients, complementing its core vitamin, carotenoids and nutritional lipids portfolio and power the nutrition of the future. Examples include Tolerase® G, an enzyme designed to break down gluten and Frullanol®, a tomato-based concentrate proven to contribute to healthy blood flow. Attendees can discover how these proprietary, science-backed ingredients can be used in their business to do more with nutrition, and create unique products targeted at consumers with specific health or lifestyle concerns.

Delegates are also invited to join DSM for happy hour at the booth, which will be running from 4pm to 6pm on 15 and 16 May. For more information or to book an appointment with a DSM expert at the show, contact marketing.DNPE@dsm.com or visit www.dsm.com/food.
Discover new probiotic ranges for Kids and Teens and Sport nutrition and Vitafoods

During Vitafoods Europe 2018, Lallemand Health Solutions will present its complete probiotic range for Kids and Teens, Sport nutrition, as well as Natural Defenses, Gut health and Mood Balance (Gut-Brain Axis). The company is today the first probiotic producer whose production facilities in Canada bear the United States Pharmacopeia (USP) Quality Systems GMP certificate (Dietary Supplements).

Hearty kids and teens
Lallemand Health Solutions offers documented probiotic strains and formulations combined with specifically designed delivery forms and flavors to target the needs of children, teenagers, and health conscious parents. These formulas can help address key issues: natural defenses, gut health, stress, and oral health. Part of this range are the clinically documented ProbioKid® formula (reduction of common winter infections occurrence in children), and Bifidobacterium lactis LAFTI® B94, recently shown to reduce constipation and bloating in children and adolescents with Irritable Bowel Syndrome (Baştürk et al., 2016).

Probiotics for Sport Nutrition
There is a growing interest in probiotics for sports nutrition market. Athletes’ population is recognized as a good model to document their effects on natural defenses in adults in general and obviously in athletes in particular. Based on the most recent clinical research in this area, Lallemand Health Solutions has developed a portfolio of specific probiotic strains to support gut health, boost natural immune defenses and deal with the stress of everyday life. The strain Lactobacillus helveticus LAFTI® L10, with four clinical studies and several in vitro and in vivo mechanistic studies, is the first clinically tested probiotic strain demonstrating support for athletes’ immune health. In a recent study, (Marinkovic et al. 2016), L. helveticus LAFTI® L10 significantly shortened the duration of URTI-like episodes by 3.4 days (p=0.047) and normalized the CD4+/CD8+ ratio (p=0.020). Based on these clinical results, Health Canada has recently granted two new health claims for L. helveticus LAFTI® L10 for active adults. Claims such as “Promotes gastrointestinal health in physically active adults” and “Helps reduce the incidence of cold-like symptoms in adults with exercise-induced stress” are now available for this unique probiotic strain.

For more information, please visit www.lallemand-health-solutions.com, or contact healthsolutions@lallemand.com

Visit Lallemand Health Solutions Booth H44 at Vitafoods Europe to discover these new ranges and more!
The Future of Sweet

trends in sugar reduction, and natural sweetener alternatives

As consumer demands for “natural”, “clean label” and “transparency” continue to gain momentum, manufacturers and consumers alike are looking for simple and recognizable ingredients, as well as traceability across the supply chain. Additionally, there is increasing market demand for sugar reduction and natural sweetener alternatives. Consumers are looking at both front and back labels, going online, and participating in reviews, conversations, and social media to learn more about the ingredients in the products they purchase.

What is Natural?

The FDA is working to come up with its own definition of “natural”, and consumers are demanding more clarity. Until there is clear definition, “natural” is definitely a grey area, and definitions vary widely. Suppliers and manufacturers must provide education and full transparency regarding ingredients and the production process.

Previously, the term “natural” had a more significant impact on consumer decisions, but with the confusion surrounding the current definition, shoppers are looking for more specific messaging and information. Terms like “plant-based” and “fruit-based” are being sought out more, and seem to be terms that consumers understand and trust.

For the sweeter industry, manufacturers with ingredients that align with this messaging are more likely to grow, as these are the ingredients that align with current trends and consumer demands.

Removing Sugar is No Simple Matter
There is a global trend with major consumer packaged goods manufacturers committing to remove artificial ingredients and reduce sugar content in their products. This has triggered a wave of innovation for ingredients and sweeteners throughout the food and beverage industry. Food and beverage manufacturers must adapt in order to retain current customers and acquire new customers demanding more of the foods and beverages they consume.

According to MINTEL, 49% of consumers worldwide avoid food and drinks that contain artificial sweeteners. However, while consumers are looking for healthier alternatives and less sugar, they are also not willing to give up taste. MINTEL also reported that taste is the most important product attribute to consumers. For this reason, reducing sugar in food and beverage products cannot be done at the expense of flavor and familiarity.

Many food and beverage manufacturers are working to reduce the sugar content in their products. However, product reformulation is not a simple matter. It is a science with implications far beyond simply removing sugar and replacing it with another sweeter ingredient. Sugar has certain chemical properties, like bulking and caramelization, and removing it can greatly impact a product’s texture and taste. There are complex commercial considerations and a lot of investment in R&D efforts that must go into reaching the desired final product result.

Now, more than ever, ingredient suppliers and manufacturers are strategically in order to ensure the global output meets demand and the supply chain is secure enough for food and beverage companies to have the confidence to move forward with formulating products.

Maintaining a Sustainable Supply Chain
For suppliers and manufacturers, keeping up with the demand for a new ingredient’s growth can be challenging. Sweetener ingredient suppliers for products like stevia and monk fruit are forced to invest significantly and plan strategically in order to ensure the global output meets demand and the supply chain is secure enough for food and beverage companies.

For Layn, its commitment to supporting sustainability and preservation of the environment. Protecting the planet is a top priority. Layn is strictly adherent to the International Code of Conduct, and is constantly working to reduce its carbon “footprint”. Layn recently moved to its 4th generation facility with state-of-the-art technology and equipment, which are not only focusing on higher yields and efficiencies, but also more environmentally friendly and sustainable production practices. For example, Layn recycles 99.2% of its water with a special membrane-filtration process, which reduces wastewater by 60%. Layn also repurposes its biomass for use as fertilizer and animal feed, which goes a long way in minimizing our environmental footprint.

For Layn, its farming families are an integral part of the team. Once the farming agreement is signed, the contracted co-op groups are provided with seedlings developed from Layn’s in-house breeding programs, and trained in the standardized cultivation process. To ensure the highest quality crops, Layn monitors every stage of the agronomy process—from planting and harvesting to drying. Its farmers have secured/guaranteed income for sustained living, and adhere to strict environmental and production guidelines. These closely-managed farming partnerships, with supporting documentation, provide full traceability—from seedling to field to finished product. It also gives Layn the ability to quickly scale production to meet global demands.

For more information on Layn’s sweeter portfolio, technologies and tools, please visit: www.layncorp.com.

About the Author
Shaun Richmond is Vice President of Sales, North America and Global Accounts for Layn, a global leader in the vertically integrated production of premium quality plant-based sweeteners and flavors. He has spent much of his career in senior roles within the natural food and beverage industry. Shaun earned his degree in Business from the University of British Columbia, and a degree in International Business from Hogeschool Zeeland in the Netherlands.

By Shaun Richmond
Longvida’s® Solid Lipid Curcumin Particle . . . the next era of cognitive and retinal amyloid plaque detection and support

The eyes have long been referred to as a window to the brain. New research shows that analogy is only partially correct. The eye, particularly the retina, is actually a corner of the brain’s central nervous system. It is this knowledge that is leading scientists and physicians to better understand the correlation between the health of the brain and the retina. This revelation has dramatic impact on how to maintain eye and brain health and identify possible retinal and cognitive pathologies in aging populations prior to the onset of symptoms. At the heart of this concept is a retinal amyloid pathology and imaging trial, Retinal amyloid pathology and proof of concept imaging trails in Alzheimer’s disease, published in Feb. 23, 2017 in JCI.

For decades, researchers have sought a noninvasive means to detect cognitive pathologies, such as Alzheimer’s disease (AD). Attempts to find highly specific and sensitive methods for early detection in live subjects were constantly met with roadblocks. A recent proof-of-concept study, using an amyloid fluorescence, Solid Lipid Curcumin Particle (SLCP) and Longvida®, with a high-end definition eye scan establishes a new method of detection in live patients. The patented Longvida curcumin with SLCP technology enables the uptake of free curcumin through the lymphatic system by delivering it to target tissues via chylomicrons. This allows curcumin to cross the blood-brain barrier, bind and illuminate amyloid plaques.

Longvida’s SLCP curcumin technology opens up a number of possibilities for early detection of retinal and cognitive pathologies, as well as potential opportunities for screening, assessing progression and monitoring response to therapy. “The retina as an extension of the brain presents an appealing target for a live, noninvasive optical imaging of AD if disease pathology is manifested there,” wrote the researchers in the JCI insight study.

Ocular Abnormalities in Cognitive Impairment and Disease

A growing amount of research shows that patients with AD and mild cognitive impairment (MCI) display a wide spectrum of ocular abnormalities and visual impairments. The retinas of AD patients frequently display pathologies such as nerve fiber layer (NFL) thinning, retinal ganglion cell (RGC) degeneration, reduction of blood flow, vascular alterations, astigmatism and abnormal electroretinogram (ERG) patterns.4-6 All too frequently, visual symptoms, such as age-related macular degeneration (AMD), may precede the onset of dementia, which is recognized as development of senile plaque and tangles within the visual areas in the brain.6 See the excerpt.

Although brain imaging is very advanced, until this century there was a significant gap in understanding how closely the retina and central nervous system are inextricably linked. This new insight is offering clues as to how to address the problem of AD, retinal amyloid pathology and its relationship to amyloid beta protein (Aβ) deposits in the brain. And as there appears to be a lengthy prodromal phase in both the retina and the CNS before a clinical diagnosis, researchers believe that this new finding may facilitate the identification of at-risk populations earlier and more effectively.

To better understand how this is possible, it’s important to understand the similarities between the retina and CNS. The retina shares a number of similar morphological and physiological characteristics with the brain, including neurons, astroglia, microglia, microvascular and blood barrier. The axons of the optic nerve connect the retina and the brain, and the facial vessels contain the amyloid precursor protein neurosecretions (APP).7 This large membrane protein is responsible for neuron growth and repair. However as one ages, a corrupted form of APP can destroy nerve cells and lead to the formation of amyloid-beta (Aβ) peptides. These Aβ peptides clump into oligomers, which then form Aβ plaques. The most significant similarity between the retina and CNS is that retinal neurons and glia both express the proteins that are implicated in the formation of Aβ plaques and resulting plaques.

While Aβ plaque is a well-known pathology of AD, the manifestation of Aβ plaque in the human retina is a relatively new finding.8 The study authors of the cited study began their research by identifying retinal Aβ plaque in the eyes of AD patients and from suspected early-stage cases. They compared this data to age-matched non-AD individuals and found no or low evidence of plaque.

Identifying Amyloid B-42 Protein Deposits

This study exemplifies significant progress in finding a noninvasive means to identify retinal amyloid in live individuals with a concept that until this study was largely unknown. The clinical proof-of-concept trial included 16 subjects, including 10 AD patients and 6 healthy controls. The AD patients exhibited mild-to-moderate clinical symptoms and were suspected to be amyloid positive. The study evaluated the cognitive and visual performance of the controls were cognitively healthy and were expected to have low or no amyloid burden.

The subjects received Longvida oral curcumin for 10-day and were scanned using a scanning laser ophthalmoscope (SLO) from baseline and throughout the study. Prior to the human study, Longvida Optimized Curcumin was evaluated and analyzed with other brands for absorption in the blood and brain and for effects on mood and memory. The highest brain concentrations were obtained with Longvida Optimized Curcumin coated with a lipophilic matrix.9-11 These studies showed a respective improvement in working memory, mood and alertness, as well as a reduction in serum triglycerides and lowering of plasma beta amyloid protein concentrations.

Study Findings:

1. In AD patients, most retinal Aβ deposits were found in clusters in the mid and far-periphery superior quadrants, often along blood vessels.
2. AD patients showed an increase in retinal amyloid index (RAI) scores and spot numbers as compared to healthy controls. AD patients showed a significant 2.1-fold increase in RAI scores.
3. The mean RAI for AD patients was 79.8 +/- 7.24 as compared to 30.2 +/- 5.2 for controls.
4. The minimum RAI for AD patients was 43.9 as compared to 18.4 in the controls.

Health Policy Experts Calling for Emphasis on Eye and Brain Health

In late 2017, a study measuring the prevalence of Age-Related Macular Degeneration (AMD) in Europeans showed the numbers of affected individuals will increase considerably in the next decade. By 2040, the estimated number of individuals in Europe living with early AMD will range between 14.9 and 21.5 million, and for late AMD between 3.9 and 4.8 million.12 In North America, approximately 11 million people have some form of AMD. This number is expected to reach 16 million by 2020 and 288 million by 2040.13 The estimated global cost of visual impairment due to AMD is $343 billion, including $255 billion in direct health care costs.

As one can see, AMD will continue to remain a significant public health problem among Europeans and North Americans for decades to come. And when one combines this knowledge with recent evidence that the eye serves as a biomarker for brain health, it becomes all the more important to address both the eye and brain when seeking ways to support healthy function. “Chronic vision impairment as a consequence of AMD, and may be a risk factor for, many comorbid conditions including sensory impairments, depression, anxiety and cognitive impairment,” writes Steven Teutsch, MD lead author of the National Academies of Sciences (NAS), Making Eye Health a Population Health Imperative: A Vision for Tomorrow (2016).14

Making Eye Health a Population Health Imperative: A Vision for Tomorrow

By Sonya Cropper, Vice President Innovation and Marketing, Verdure Sciences

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RESURRECTING NUTRACEUTICALS WITH LIQUID ENCAPSULATION TECHNOLOGY (LET)

The global nutraceutical industry, valued at US$182.6 billion in 2015, is one of the fastest growing industries today and is expected to expand at a CAGR of 8% from 2015 to 2021. The growth can be attributed to consumers’ inclination to use nutrition for their health and wellness. Recently, consumer preference has undergone a paradigm shift from choosing synthetic ingredients to natural and organic foods, beverages, and supplements. A recent survey found that about 70% of consumers are happy to pay a higher retail price for a product made with ingredients they recognize and trust.

The current spotlight, therefore, is on nutraceuticals with a ‘clean label’—nutraceuticals containing natural ingredients that consumers recognize. In contrast to the well-defined chemical entities in pharmaceuticals that are used in nutraceuticals are diverse, containing multiple components in a single product. Many of these natural ingredients have physicochemical properties, such as low solubility, that pose a challenge for formulation scientists. Thus, the successful development of nutraceuticals requires knowledge of the fundamental aspects of the physical and chemical properties of the ingredients and delivery system. Liquid Encapsulation Technology (LET) is one of the most promising and cost-effective strategies to address the multiple physicochemical challenges associated with the use of nutraceutical ingredients. Recently, there has been a renewed interest in using liquid-filled hard capsules after having rediscovered its advantages. The most important advantage of these capsules is their ability to formulate compounds with poor solubility. Additionally, they can help accelerate the speed to market by providing flexibility to rapidly develop and test formulations in-house at R&D and large scale.

Most importantly, from a branding perspective, liquid-filled capsules can serve as a valuable tool to create a distinct brand differentiation in health and wellness, which is in line with the latest trends. This novel dosage form can be utilized for reintroducing existing formulations in a new attractive form. Furthermore, the encapsulation process can be used in-house at R&D and large scale. This requires a high capital expenditure and a system. To a certain extent, it was the nutraceutical sector, apart from formulation benefits. These advantages include:

- **Consumer preference**
  - The nutraceutical industry uses various commercial approaches for providing innovations in the oral drug delivery system. To a certain extent, it was the nutraceutical sector, which led the early adoption of liquid-filled hard capsule products to market. Since the nutraceutical industry is in close contact with the consumers, they understand consumer needs. Lately, consumers are seeking more benefits from delivery systems beyond those possible through traditional (tablet and capsule) technologies. As a result, the formulator needs to work harder to cater to increasing consumer demands. As the nutraceutical industries look to carve a niche of their own and create a differentiated product, an important trend is the growth and diversity of new dosage forms that enjoy consumer preference. Consumers prefer liquid-filled capsules as they are easier to swallow. These capsules are also considered to work faster and better. Moreover, the capsules can also be made visually attractive to guarantee instant consumer appeal.

- **Commercial benefit**
  - Novel formulations combining two or more compounds are excellent lifecycle management strategy to revitalize product pipelines. Combining existing compounds is less expensive, hastens the speed to market, and is less risky to develop.

- **Improved bioavailability**
  - Compounds with poor solubility may suffer from poor bioavailability. Liquid-filled capsules are ideal for compounds with poor solubility and can, therefore, improve bioavailability of such compounds. Multiple combinations of release profiles within a single hard capsule are also possible. Figure 1 shows different combination fills possible in hard capsules.

Table 1: Benefits of hard capsules for nutraceutical manufacturers

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ease and convenience</td>
<td>Softgel capsules are easy to manufacture in-house. The entire manufacturing process—from preparing the gelatin solution to encapsulation, and finally drying the capsules under a controlled operating environment by maintaining low relative humidity—must be performed in-house. This makes encapsulation a considerably large space. In contrast, manufacturing of empty hard capsule is easier, requiring minimal space, operator skills, and investment. The manufacturer just needs to invest in installing an automated, compact filling and sealing machine.</td>
</tr>
<tr>
<td>Scalability and flexibility</td>
<td>Even at an R&amp;D stage, softgels must be manufactured in large batches. In contrast, liquid-filled hard capsules can be manufactured at an R&amp;D scale and can be scaled up easily, making it convenient and economical for product development. Manufacturers can keep the entire product development process in-house to protect their intellectual property, while significantly reducing the ‘concept-to-counter’ time for their products.</td>
</tr>
</tbody>
</table>

**Table 2: Examples of marketed nutraceuticals filled in hard capsules**

<table>
<thead>
<tr>
<th>Nutraceutical</th>
<th>Brand</th>
<th>Licence Holder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Krill oil</td>
<td>Grace DBT</td>
<td>NutraCure</td>
</tr>
<tr>
<td>Flaxseed oil</td>
<td>Omega Max</td>
<td>CoQ10, amino acids</td>
</tr>
<tr>
<td>Caffeine sulphate</td>
<td>Tryptophan</td>
<td>GNC</td>
</tr>
<tr>
<td>Sea buckthorn oil</td>
<td>Grace DBT</td>
<td>NutraCure</td>
</tr>
<tr>
<td>Coenzyme Q10</td>
<td>CoQ10</td>
<td>Heritage Nutrition</td>
</tr>
</tbody>
</table>

**Figure 1:** Examples of combination fill hard capsules

**Conclusion**

LET has been around for long. However, there is a resurgence in its use in recent times. Formulators are now rediscovering the myriad benefits of using the technology to meet emerging and eclectic market needs. Apart from solving the formulation challenges, LET can provide a unique and innovative scope for products enabling distinct brand visibility. With such incredible opportunities, LET is definitely here to stay in nutra for a long time.

http://www.acg-world.com/capsules

References


Nutraceuticals now

Lecithins...making lives healthier

Feelings of general indisposition, disturbed functions and even diseases of the human and animal organism can be traced back to membrane damage or imbalance. By administering phospholipids it is possible to influence membrane functions associated with membrane proteins and correct them at least to a certain extent—sometimes even completely.

Lecithin and phospholipids are natural substances with a wide potential as emulsifiers, nutraceuticals and membrane forming substances. In nature, phospholipids are the crucial building blocks of all biological membranes—organized as phospholipid double layer with the fatty acids creating an inner barrier between the aqueous inner and outer compartments. Composition and fatty acid profile of the phospholipids determine to a wide extent the functionality of membranes and particularly of membrane integrated biological molecules (enzymes, receptors, channel proteins).

On the one hand lecithins are biologically important; on the other hand isolated lecithins are used for both functional and processing technology in a wide range of industrial application.

Extensive scientific studies have demonstrated the effects on the human body that can result from the nutritional action of phospholipids such as phosphatidylserine as a brain cell nutrient, phosphatidylcholine for liver cell regeneration, soy phosphatidylcholine for liver cell regeneration, soy phosphatidylserine as a basis for production of stable liposomes.

Phosphatidylcholine (or simply PC) is the most abundant phospholipid found in animals and plants.

PC is recommended against a wide range of liver disorders (alcohol, chemicals, irradiation induced), but also to lower elevated cholesterol levels and to improve physical performance.

In various clinical studies phosphatidylcholine has been used successfully to treat liver diseases. The most frequent of these were accurate and chronic cirrhosis of the liver, fatty degeneration of the liver, hepatic coma and liver damage resulting from poisoning like alcohol, chlorinated hydrocarbons, medicines etc. In cases of previous liver damage phosphatidylcholine has brought about a marked improvement in the speed of recovery (repair, renewal and regeneration of the liver parenchyma).

The beneficial effect of phosphatidylcholine on the liver is connected with its role as central building block in the cell membrane. Phosphatidylcholine is of great importance for the structure and the functioning of the membrane systems of all body cells.

A study of the department of gastroenterology, internal Medicine of the University Clinics of Heidelberg could show that phosphatidylcholine plays an important role in the prevention of chronic inflammatory bowel disease (ulcerative colitis and Crohn’s disease). Phosphatidylcholine is one component of mucus and is thought to be responsible for establishing a protective hydrophobic surface. The lack of PC in this layer leads to a decreased fat protective coating which can contribute to the development of inflammation.

On account of these investigations the supplement of the missing phosphatidylcholine was used as a strategy of treatment to improve the ulcerative colitis (UC). By this it could be demonstrated that oral intake of a granulated PC formulation compensates the lack of PC in the mucus layer.

Phosphatidylserine (PS) is well known for improving cognitive performance as well as for alleviating stress symptoms.

There are several nutritive factors which can influence brain functions like memory, learning, information recall and even mood. Of special importance are substances which have a direct or indirect influence on the membranes of the nerve cells, their composition and physicochemical properties. The membranes are the master switch and work surface for most of the brain’s metabolic processes. Phosphatidylserine is such a substance. It is a safe, natural dietary supplement which has been proven to support and enhance the brain’s activity across a number of areas, as well as preventing cognitive decline. Phosphatidylserine (PS) is a naturally-occurring phospholipid derived from soy lecithin. Phosphatidylserine are the main components of all the membranes of our body cells, but Phosphatidylserine has particular importance as it is highly specialized and found in nerve and brain cells.

Phosphatidylserine is primarily located on the inside of the cell where it acts as a defence for transporting proteins and enzymes of the cell membrane. The cell needs these in order to be active, carry on communication, and convey substances from outside to inside and vice versa. Phosphatidylserine also plays a particular role in nerve cell communication by stimulating the release of neurotransmitters: acetylcholine (for clear thinking), noradrenalin (antagonist of adrenaline), dopamine (hormone regulator) and serotonin (‘well-being’ hormone).

The neurotransmitters are assembled in small vesicles at the nerve ends. Their release may be retarded by a wide variety of factors (like stress, overstrain, age and so on). PS restores the flow.

If our diet does not contain sufficient PS, the effect is rather like a car with the ignition not working properly. Although there is enough fuel available, there is no spark and the neurotransmitters are not sent on their way from one nerve end to another. The message gets lost.

PS does not only influence the major transmitter systems to produce an overall harmonising effect on the brain. It also helps the brain to process energy. Our brains require massive amounts of energy to keep their functions properly. PET positron emission tomography shows that energy turnover in human brains is drastically affected following oral intake of PS. It has also been shown that PS can regenerate the density of our nerve cell communication network which usually deteriorates during aging, but by no means least, PS lowers cortisol, a catabolic stress hormone that injures brain cells and negatively affects body composition.

Besides phosphatidylcholine and phosphatidylserine which have been described sphingomyelin and gangliosides are part of the polar lipids present in milk phospholipids. These polar lipids occur exclusively in animal organisms but they have interesting health effects on the human body.

Sphingomyelin is an effective cholesterol-reducing substance which is substantially involved in the construction of the myelin sheath of nerve fibers of the central nervous system. It affects cell growth, cell differentiation and programmed cell death (apoptosis). Sphingomyelin, especially its metabolites, even has a positive effect in the prevention of colorectal cancer.

Gangliosides are able to reduce the negative impact of pathological and bacterial endotoxins on the digestive tract of infants. Gangliosides have also therapeutic potential in the treatment of local and systemic inflammations.

Every phospholipid has its own specific application profile. The phospholipids of LECICO provide the opportunity to find innovative solutions for healthy food products.

LIPAMINE PS is phosphatidylserine (PS), a naturally-occurring phospholipid derived from soy lecithin, available as fluid and powder. It is made up for foods, beverages or dietary supplements that can help boost mental health improve mental performance and uplift mood. PS is well-tolerated by the body and shows effects already at a dosage level of 100 mg active substance per day. The role of PS is extremely well documented. It has been researched in more than 50 human clinical studies over a period of more than 20 years in North America and Europe.

The new and innovative soy lecithin powder LIPAMINE PC 30 P IP has an enriched content of phosphatidylcholine. It is used especially as a nutraceutical in functional food formulations, aerosols, ointments, as excipients in pharmaceuticals and liposomes. The yellowish powder is a natural choline source, improves liver metabolism and the absorption of lipophilic nutrients.

The product LECICO SUN G 400 is a non-allergenic deoiled lecithin granules and has been launched together with the new LECICO G 700 IP: Both deoiled lecithin granules are light tan to medium yellow in colour for use in various health supplements, functional food systems or as direct consumption. They are high bioavailable sources of phospholipids and provide a broad range of nutritional benefits for consumers. The deoiled lecithins are natural sources of choline that is important for liver function, proper brain function and maintaining a healthy metabolism.

In Summary

The research demonstrates that phospholipids - the functional ingredients of lecithin - are substances vital to the human body and are nutritionally extremely important. As cell-membrane nutrients, phospholipids support numerous cell functions, helping the body maintain homeostasis and recover from damage. The synergies of technology and physiology make phospholipids ideal candidates especially for health food, food supplements and functional foods.

Reference

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LECICO G 700 IP

LECICO SUN G 400

LECICO G 700 IP: Both deoiled lecithin granules are light tan to medium yellow in colour for use in various health supplements, functional food systems or as direct consumption. They are high bioavailable sources of phospholipids and provide a broad range of nutritional benefits for consumers. The deoiled lecithins are natural sources of choline that is important for liver function, proper brain function and maintaining a healthy metabolism.
Beyond Preventing Age-Related Eye Disease

...vision performance and the macular carotenoids

By Brian Appell, Marketing Manager, OmniActive Health Technologies, Morristown, NJ omniactives.com

Much of the time, it is difficult to convince a young, healthy person to take a supplement that may help their vision many years down the road. Moreover, these younger consumers are looking for products that target specific benefits rather than prevention. The good news is that the macular carotenoids (lutein, RR-zeaxanthin and RS (meso)-zeaxanthin) have been shown in numerous studies to provide benefits by supporting not only visual health but also visual performance.

Visual performance can be described by several key functions:
- **Contrast Sensitivity**—Contrast sensitivity pertains to the ability to see the difference between objects as well as depth perception. It is especially important in situations of low light—such as driving at night, or under conditions of fog or haze.
- **Glare Performance**—Glare occurs under conditions of direct, bright light. It also occurs when using digital devices like computers and smartphones because the light emitted is focused directly into the eyes. Glare not only disrupts clear vision but can also lead to eye fatigue and strain.
- **Photostress recovery**—Bright flashes of light or sudden changes in light intensity require your eyes to adjust rapidly. The ability of the eyes to recover from the temporary blindness resulting from a flash bulb is an example of photostress recovery.

**The Macular Carotenoids Protect AND Perform**

In a 12-month randomized, double-blind, placebo-controlled study—known as the B.L.U.E. (Blue Light User Exposure) study—young, healthy subject supplemented with either a placebo or two different doses of lutein and zeaxanthin isomers (10 and 2mg or 20 and 4mg, respectively, from Lutemax 2020) resulting in a significant improvement in glare performance, photostress recovery and contrast sensitivity compared to placebo at both doses after 6 months with additional improvements found at 12 months. The B.L.U.E. study also demonstrated that supplementing with all three macular carotenoids from Lutemax 2020 in those exposed to various sources of high-energy blue light—including sunlight, digital devices, screens and LED lighting showed significant improvement in eye fatigue and eye strain—symptoms associated with long-duration exposure to blue light.

Macular carotenoids may be just what consumers are looking for—optimizing visual performance now and supporting healthy vision as they age.

**References**
Anlit Ltd., Israel, will launch a high-DHA omega-3 supplement in a single fish-shaped chew for pregnant women. Anlit’s “Omega Bites” supplement line is a fun, chocolate-flavoured fish-shaped single-serving bite containing a high (103mg) concentration of DHA and 47mg EPA for a total of 150mg omega-3 fatty acids. This new supplement joins the OmegaBite high-DHA+EPA line that was launched last year.

Omega-3 essential fatty acids are vital for neural and cognitive development and function, needed throughout fetal growth and beyond. The consumption of fish—a main dietary source of omega 3s—is declining among children, pregnant women and adults. On the other hand, the texture, taste and smell of omega-3 oil is often challenging, leaving few viable avenues to get adequate intake of this important nutraceutical component.

Anlit’s technology overcomes challenges such of stability and unpleasant flavour and aroma, providing a tasty and healthy solution for kids and adults. The delicious, chewy matrix also helps overcome “pill fatigue”, the reluctance to take nutritional supplements.

Delicious 150mg Omega-3 Supplement for pregnant women

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Part 1: The origin of Monk Fruit
Luo Han Guo, a herbaceous perennial vine of the Cucurbitaceae (gourd) family, is praised as "Monk Fruit". It is a kind of dioecious plant with heart-shaped leaves. Monk Fruit blossoms in summer and fruit in autumn. The main function of Monk Fruit is relieving cough and reducing sputum. The fruits have high nutritional value, including vitamin C (400-500mg per 100g fresh fruit), glucoside, fructose, glucose, protein, lipid, etc. It has been around 300 years since planting Monk Fruit in China.

Part 2: The growth area of Monk Fruit
Monk Fruit is grown in warm and cool environment, large temperature difference between day and night, long frost-free period. The seedlings are shade-tolerant. The grown plant is photophilous, but exposure to the sun for too long will cause pollen sterility problem. Abundant rain but without hydrops is required during growing period. It is usually grown in well ventilate and water-repellent hillside, which is about 300-1000m in altitude. In Guilin Province, the planting area for Monk Fruit is about 150,000mu, while in Hunan Province, it has about 50,000mu where shows very rapid expanding trend. Hunan Nutramax Inc, a company which is specialized in producing Monk fruit Extract, owns about 40,000mu planting base including 10,000mu with organic standard.

Part 3: The process of Monk Fruit Extract
Early back to 1996, the Monk Fruit Extract Morgroside V was approved to be used as Sweetener by Chinese Pharmacopeia. And in 2002, the US FDA has approved Monk fruit Juice as a kind of food additive and allowed to be used in food and drinks. Hunan Nutramax Monk Fruit Extract 10%-95% Morgroside V was listed in FDA GRAS (Gras No. 706) in 2017. According to the EFSA Website, it was in considering of allowing Monk fruit Extract to be used in European countries. In China and US, Monk Fruit Extract was applied into over thousands kinds of products. As expected, Monk Fruit Extract maybe will approved by Novel Food in European soon.

Part 4: the Application of Monk Fruit Extract
Compared with traditional sweeteners, Monk Fruit Extract showcases more advantages. It contains very low calories, zero fat, and is very beneficial to preventing diabetes, relieving cough. What's more, the taste is better than Stevia Extract as many people complain about the bitter after taste in Stevia Extract; The sweetness for Monk Fruit Extract MV50 is about 280 times than Sucrose. Hunan Nutramax Inc has obtained a patent of extracting Morgroside V 60% from Monk fruit. Moreover, in order to comply with market trend, they are now dedicating into improving the content of Morgroside V to be over 95%. This product could be widely used in Beverage & Food, Nutraceuticals, Bakery, Snacks, Chocolate etc.
Vitamin D

Vitamin D is a fat soluble, micronutrient essential to human health. It is not stored in the body, but rather a hormone involved in calcium homeostasis. The body produces vitamin D as a result of exposure to UV light from the sun. Adequate sun exposure is the best and most efficient way to obtain vitamin D, however in the UK this can be difficult to achieve, particularly in the autumn and winter months. Variations such as time of day, season, latitude, skin pigmentation and age can affect the amount of vitamin D converted in the skin.

Vitamin D is a hormone produced in the skin as a result of exposure to UV light. It is synthesised in the body as a result of exposure to ultraviolet radiation, which is primarily obtained from the sun. Vitamin D is essential for the maintenance of bone health and is also involved in many other physiological processes, including the regulation of calcium and phosphorus homeostasis, immune function, and the prevention of certain chronic diseases.

Vitamin D deficiency is a common problem worldwide, and it is estimated that up to 75% of the population may be affected. The main cause of vitamin D deficiency is insufficient exposure to sunlight, which is crucial for the production of vitamin D in the skin. Other factors that may contribute to vitamin D deficiency include poor dietary intake, inadequate food fortification, and certain medical conditions that affect vitamin D metabolism.

Vitamin D has been associated with a wide range of benefits, including the prevention of osteoporosis, reduced risk of falls, and improved muscle function. In addition, there is evidence that vitamin D supplementation may reduce the risk of certain chronic diseases, such as type 2 diabetes, cardiovascular disease, and certain cancers. However, the optimal dose of vitamin D and the best way to obtain it remain the subjects of ongoing research.

Vitamin D and osteoporosis: Vitamin D deficiency is a major risk factor for osteoporosis, a condition characterised by low bone mass and an increased risk of fracture. Vitamin D is essential for the absorption of calcium and phosphorus, which are necessary for bone health. Low levels of vitamin D can lead to a decrease in bone density, making the bones more fragile and increasing the risk of fracture.

Vitamin D and other cancers: There is evidence to suggest that vitamin D may have a role in the prevention of certain types of cancer, including breast, prostate, and colon cancer. Studies have shown that higher levels of vitamin D are associated with a reduced risk of these cancers, although the mechanisms by which vitamin D exerts its anti-cancer effects are not fully understood.

Vitamin D and immune function: Vitamin D is an important regulator of immune function, and deficiency is associated with an increased risk of infections. Vitamin D helps to maintain the balance between pro-inflammatory and anti-inflammatory responses, and it is involved in the differentiation and function of immune cells.

Vitamin D and chronic diseases: Vitamin D deficiency has been linked to an increased risk of chronic diseases, including type 2 diabetes, cardiovascular disease, and certain cancers. However, the evidence for these associations is not always consistent, and the mechanisms by which vitamin D may influence these diseases are not fully understood.

Vitamin D and lifestyle: Vitamin D deficiency is more common in certain groups, including those with limited sun exposure, ethnic minorities, and people with certain medical conditions. In addition, vitamin D deficiency is a common problem in elderly people, who may be less able to synthesise vitamin D from sun exposure.

Vitamin D and food fortification: Food fortification with vitamin D is a common strategy to improve vitamin D status and reduce the risk of deficiency. Fortification of foods such as milk, cereals, and margarine with vitamin D is an effective way to increase vitamin D intake, but it is important to note that even fortified foods may not provide sufficient vitamin D for some populations.
REFERENCES


NEWS APPOINTMENT . . . NEWS APPOINTMENT . . . NEW

QUIIMDIS SAS appoints Dr. Ajax Mohamed as Senior Vice President and Director of Quimdis GmbH

Paris, France March 27, 2018 – Dr. Ajax Mohamed has been named Senior Vice President and Director of Quimdis GmbH, the German division of the Quimdis SAS Group of companies.

Dr. Mohamed holds a Doctorate Degree in Chemistry from AMU, Aligarh, India. In 1998 he received a DAAD fellowship at George August University, Göttingen, Germany for post-doctoral research which he later continued at Goethe University, Frankfurt.

Dr. Mohamed has more than 20 years of experience in R&D, technical sales and marketing. After completion of his research work, Dr. Mohamed joined as a Sales and Marketing Manager for an international company in Frankfurt and later on joined as a senior business consultant and moved on to become the head of business consulting at Benefitax, Frankfurt.

Before joining Quimdis GmbH in 2018 as Senior Vice President & Director, he headed the European business unit of Sabinsa/Sami group of companies. For the last 10 years Dr. Mohamed has handled marketing and sales activities in Europe with extensive knowledge in the field of Nutraceuticals, Cosmeceuticals, Flavours & Fragrances.

“We enthusiastically welcome Ajax to Quimdis” said Jean-Francois Quarre, Founder and Chairman of Quimdis SAS. “Ajax has extensive leadership experience in our field, and he has a proven track record of driving excellence across commercial and operational functions.”

“We’re pleased to have his talents and expertise helming Quimdis GmbH.”

Quimdis expands into Germany

European distributor of raw materials for the pharmaceutical, dietary, food, feed, cosmetics and perfumery industries for 30 years, Quimdis has strengthened its presence in one of the main markets in Europe with the opening of a new branch in Germany. Present in France (headquarter in Levallois and industrial site in Grasse), Italy, Spain, Morocco and China, the company, whose turnover amounts to 82 million euros in 2017, is pursuing its development strategy through this investment.

From chewable bunny tablets, to gummies, capsules and tablets, your probiotic must survive and you can be sure it will with Sabinsa’s LactoSpore® probiotic. Stable at room temperatures, safe and clinically tested LactoSpore efficiently supports a healthy balance of natural microflora in the gastrointestinal tract; helping the body’s natural defenses to effectively combat stress and imbalances.* LactoSpore being in naturally encapsulated spore form remains viable on processing and storage, advantageously producing the beneficial L (+) form of lactic acid and other healthful metabolites upon delivery.

PATENTS: US 9,577,352; US 9,717,766

www.sabinsa.com | www.lactospore.com

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Reduce Burps, No Coating Needed. Catalent RP Scherer was the first to encapsulate Omega-3 fish oil products. Today, we’re proud to introduce our newest, patented technology that delivers a better consumer experience—in any softgel. With its potential to reduce fishy burp, minimize aftertaste, and improve surface absorption, OmegaZero™ Technology is an ideal platform to deliver odorous oils.