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


jennewein-biotech.de
How science is shaping the future of nutritious consumables

What if you didn’t have to diet or take supplements? What if you could trust that what you consume is designed to keep you in optimum health instead? Well, that’s almost a reality. Ironically, it’s our propensity for a sedentary lifestyle and fast food that’s helping to drive demand for healthier products to consume, and thus a burgeoning research industry in support of nutritious foods and ingredients, beverages, dietary supplements, nutricosmetics and personal care.

At the upcoming Vitafoods Asia exhibition, you can see exactly how the food, supplement, beauty and pharmaceutical industries are being transformed by innovators and scientists who are working to deliver optimal health in what you consume.

The exhibition is a full-service look into the nutraceuticals industry, from its key ingredients, to contract manufacturing and labelling to services & equipment and branded finished products. Along with what is being offered commercially, there’s much opportunity to discover what is also in development. For example, how modern medicine is being sourced and developed from natural ingredients.

Bringing innovation and invention to the forefront

Vitafoods Asia brings together manufacturers at the forefront of innovation and invention in the industry to meet and discuss their product development challenges. Visitors that attend Vitafoods Asia can meet and source from suppliers of the very latest products hitting the market.

White-label and private-label products ready for market. Such products are a quick and cost-effective way to access and take advantage of rapid market growth. Product demand is driven by consumers becoming increasingly aware of preventive medicine and the positive link between diet and disease prevention. Modor Intelligence reports1,2 that collectively, Japan and increasingly China, India, Australia, Korea, Thailand and Vietnam, are growing the nutraceuticals market in Asia-Pacific by 7.5% year on year. In 2018, Grand View Research reported2 that the global nutraceutical market could be valued at $578.23 billion by the year 2025. To take advantage of this market opportunity, distributors, retailers and manufacturers can discover and source high-quality, innovative dietary supplements and functional food and beverages all under one roof at Vitafoods Asia.

At Vitafoods Asia you can source and taste the latest innovative products that help improve health, wellbeing, physical and mental health, from energy drinks to meal replacement bars, chewable supplements to effervescent tablets and everything in-between.

Bespoke Manufacturing and Private Labelling

The exhibition is an easy place to source white-label and private-label products that are ready for market. Such products are a quick and cost-effective way to access and take advantage of rapid market growth. Moreover, buyers can meet with manufacturers that create bespoke products. Whether it’s a new extract, vitamin, mineral or protein, energy bar, isotonic sports drink or enriched probiotics are more important than multivitamins and should be taken daily.”™

By Chris Lee, Managing Director, Health and Nutrition, Europe

In an industry as dynamic and innovative as ours, it’s hardly surprising there’s plenty to look forward to at Vitafoods Asia 2018! The nutraceutical and functional food industry is in an exciting phase—we’re seeing collaboration across sectors to create innovative solutions to consumer health concerns, and together, we stand on the precipice of the next health and wellness revolutions. And collaboration is what we all need right now—we need to share insights and learn up to continue shaping the industry we’re in.

Vitafoods Asia is proud to be the place where the industry meets to learn and network in this global, collaborative industry—in response to growing demand for nutraceuticals in functional foods and beverages. We serve as a platform for more than 300 exhibiting companies from around the world. You’ll find innovation in action in all corners of the exhibition. As the only dedicated event in Asia, we’re shaping the industry through connecting the entire supply chain across four key industry sectors: ingredients, finished products, contract manufacturing and services. There’s expertise, insight, innovation, and something for everyone.

Spotlighting Omega-3 and Probiotics

With increasing demand from China, Southeast Asia and other developing countries for Omega 3 means that the market for the most widely used nutritional lipid continues to grow as it controls inflammation. GOED estimates the market today globally is worth US$1.5 billion at the ingredient level. Learn more at the Omega-3 Resource Centre and Tasting Centre on the exhibition floor. The International Probiotics Association (IPA) suggests that the market for probiotics is experiencing unprecedented growth.
Nutraceuticals now | 04

Gummies, buyers can source for manufacturers to develop new products specific to their needs. Similarly, if you need help with technical manufacturing processes or to deal with ever-increasing regulatory complexities, you will be able to schedule one-on-one consultation sessions with specialists in various fields at the Industry Advice Zone to discuss regulatory advice, market access information and strategies, and marketing and innovation profiling. Discover a wide-range of service and equipment providers that are dedicated to the nutraceutical industry and help brands to develop products that deliver optimal nutrition.

**Shaping nutrition for optimal sports performance**

An example of a growing market is that demand for sports nutrition is rising as comprehension improves as to the value of nutrition among athletes and gym professionals. This is especially true of markets in China, India and Italy.

Today, functional foods and beverages that contain ingredients such as proteins, vitamins, amino acids and omega-3 fatty acids to help attain peak performance are readily available. Along with these ingredients, minerals and herbs are being used in functional beverages to help keep blood sugar levels at optimal levels is another fast-emerging market. Cosimo Palumbo, the Marketing Director for IDENA S.p.A., says that they continue participate in Vitafoods Asia because, "although we have been participating since the very first few editions, lately we’ve found that the show has grown both in number and quality of exhibitors, visitors, and scientific program. We expect the same high quality also this year and onward."

"This year, IDENA is leveraging the New Products Zone at Vitafoods Asia to launch two new products. Firstly, VazguardTM, a Bergamot Phytosome®, which uses a highly standardized bergamot polyphenols fraction that is formulated to optimize the biological absorption of bergamot polyphenols. VazguardTM is safe and effective for the reduction of cardiovascular risk by modulating total cholesterol (tChol), low-density Lipoproteins (LDL), high-density Lipoproteins (HDL), tryglycerides (TG) and blood glucose.

The other product is QuercefitTM, a new natural boost to sports nutrition. Generally, there is poor availability of quercetin, and so we are offering quercetin with the Phytosome® delivery system, which helps to improve plasmatic levels of this natural botanical active. This was proven in a pharmacokinetic study in humans. At Vitafoods Asia, we will put forward the clinical data available that demonstrates evidence of activity in conditions characterized by an abnormal oxidative stress like intensive training, improving an athlete’s performance and aiding in recovery. Ingredient innovations that are driving the future of the industry are featured in production demonstration display areas and new functional food and drinks can be sampled at the Tasting Centre.

The world’s most impactful brands are represented

The world’s most notable developers of food and beverages are represented at the Vitafoods Asia exhibition, for example, DuPont Nutrition & Health, who manufacture emulsifiers and sweeteners, probiotics, cultures and food protection ingredients; protein solutions; systems and texturants; specialty hydrocolloids; pharma excipients.

Dr. Li Yongjing, Regional President, Asia, DuPont Nutrition & Health, says “DuPont Nutrition & Health is a world leader in applying market-driven science and innovation. This year, we want to place products with health-enhancing benefits and solutions backed by groundbreaking science at the heart of our presence at Vitafoods Asia. DuPont will demonstrate excellence in demand-driven health ingredients solutions. We are also committed to sharing the research behind and we will demonstrate how our science can be translated into successful ingredient formulations and product launches at our hospitality suite. We welcome everyone to visit us at the DuPont Hospitality Suite, Angsana 3A & 3B, where our team of industry experts will be present to help turn market challenges into business opportunities.”

Registration is now open to Vitafoods Asia. Connect with over 5,500 visitors from 60 countries and explore the more than 300 exhibitors of key ingredients, branded, finished goods, medicines, nutricosmetics, personal care and animal nutrition.

Visit www.vitafoodsasia.com to register for free.

**References**

2. Nutraceuticals Market Size Worth $578.23 Billion By 2025 | CAGR: 8.8%
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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Dr Dash’s statement “Probiotics are more important than multivitamins and should be taken daily” has no association with company Sabinsa, and that Dr Dash has no association with nor endorses any other Probiotic company.
gut health, bone health and weight management are expected and the high cost of healthcare are also factors. Joint health, cardiac diseases. Inadequate nutrition, due to busy lifestyles, related diseases, along with blood pressure, diabetes, or ageing populations, are impacting the prevalence of lifestyle-related diseases, along with blood pressure, diabetes, or heart disease. Adequate nutrition, due to busy lifestyles, and the high cost of healthcare are also factors. Joint health, gut health, bone health and weight management are expected to be future demand drivers.

**Functional Foods**
Asia Pacific is now the largest regional market for dietary supplements and vitamins. Malaysia and India for instance, are grappling with the impact of rapid urbanisation on the diet. Demand for functional, healthy foods, for example, is rising. Aside from products developed in Western societies, across the region, consumers are buying products that are enriched with locally-sourced compounds and functional ingredients like probiotics, fibre, calcium or vitamin E; herbs such as tongkat ali and ginseng; along with cultured milk drinks; probiotic yogurts; and cereals that are fortified with fibre; plus, Omega-3 fortified eggs.

**Vitafoods Asia** showcases key suppliers of such ingredients and raw materials that are used in functional foods. Alongside these suppliers, visitors to the exhibition can source contract manufacturers and private labelers, as well as finished goods manufacturers.

**Functional Beverages**
To tackle alertness and reduce calorie consumption, as well as hydrate with performance additives, athletes and gym enthusiasts in countries like China and India are driving demand for nutrition through functional beverages. Energy drinks, sports drinks & nutraceutical drinks are the fastest growing segment of the functional beverage market. Due to its efficient delivery of minerals or herbs, functional beverages are emerging to help reduce the risk of chronic disease and to keep blood sugar levels under control. Drinks ingredients include vitamins, amino acids and omega-3 fatty acids. Amino acids are used to slow fatigue and vitamins are added to boost the metabolism and generate omega-3 fatty acids. Amino acids are used to slow fatigue and vitamins are added to boost the metabolism and generate energy in functional beverages. Probiotics and prebiotics are also used to ensure proper functioning of the digestive system. Another ingredient, Omega-3, is forecast to grow in the functional beverages market as it controls inflammation. At Vitafoods Asia, there’s an Omega-3 Resource Centre where visitors can witness the latest innovations and product development initiatives around Omega-3.

Manufacturers in this market segment are developing innovative flavours to appeal to consumers with drinks that are safe, taste good and are affordable. Key functional beverage manufacturers are exhibiting at the Vitafoods Asia Exhibition.

**Addressing Malnutrition**
In countries like Japan and Thailand, where despite relatively healthy diets, there are mineral and vitamin deficiencies in the population. In Thailand, Calcium and Vitamin D are issues, and doctors are prescribing supplements. The Japanese lack calcium and iron, so there is a corresponding rising in demand for probiotic yogurts and energy drinks. At the Global Health Theatre at Vitafoods Asia, the impact of the modern lifestyle on nutrition and diseases, and how food fortification is addressing these issues, will be discussed. Industry experts. Responsible nutrition, importance of fortification & fortified foods, impact on the glycaemic index, as well as the packaging of nutraceuticals into functional foods, will be discussed, among other topics.

**Processing food to protect bioactive ingredients**
At the Vitafoods Asia exhibition, visitors will learn how processes such as microencapsulation, enzyme technology, and nanoencapsulation of ingredients are being used to produce functional foods. Of late, microencapsulation technology has been developed to replace cyclodextrin (CD) molecules to protect the bioactive elements in food processing through to the storage and delivery of functional foods. Notably, product formulation for the delivery of nutraceuticals is changing. For example, Indian consumers are driving change from traditional tablets, or chewable tablets, to capsules, particularly liquid-filled capsules, which are easier to swallow and are believed to work faster and better. At Vitafoods Asia, discover novel formulations that allow nutraceutical companies to incorporate liquids, pellets, tablets and powders in capsules.

Obtaining the right advice
Attending Vitafoods Asia is an essential opportunity to connect and learn from members across the entire nutraceutical supply chain spectrum, from leading manufacturers and distributors to buyers and quality suppliers. A dedicated area, the Industry Advice Zone, is available for visitors to meet with industry experts in one to one consultation sessions, for regulatory advice, market access information and strategies, and marketing and innovation profiling. The Vitafoods Asia Conference is another chance to learn from academia, government and industry leaders. Structured to help participants maximise their learning in line with their career interests, dedicated conference tracks will guide participants towards talks on research and development, business and marketing strategies, and digestive health. Sessions also address challenges to do with market entry and regulation.

Don’t miss your chance to:

- access latest evidence based research in nutrition, health & wellbeing
- see new innovations in the Nutraceutical Showcase
- visit the Innovative Ingredients Live theatre
- connect with innovative manufacturers, suppliers & buyers with Match

See the latest in food, health and nutrition at this year’s Food Matters Live.

Register for free entry: foodmatterslive.com
UAS Labs has a long, important pedigree in probiotics. Founded in 1979 by Chairman Dr. Dash, the producer of premium probiotics has been at the forefront of the industry for almost as long as the industry has existed. Today, with equity partners and new management, UAS Laboratories, LLC has expanded its operations, added a probiotic fermentation plant, acquired Micropharma and Nebraska Culture, and added new probiotic strains and products. It continues to break new ground through its state-of-the-art manufacturing facilities, gold standard clinical trials, proven probiotic strains and development of condition-specific probiotics.

In recent years, notably since new owners took over the company in 2013, UAS Labs' commitment to pioneering practices has led them to make outsized investments. These investments include growth and process improvements in their Wausau, Wisconsin, USA manufacturing plant, the acquisition of another probiotic manufacturer, the opening of their new, state-of-the-art fermentation facility, licensing rights to clinically proven strains and ongoing clinical research. These investments have bolstered UAS Labs' status as a producer of premium probiotics with deep in-house expertise and proprietary R&D technologies—a type of company that is almost as rare today as it was in 1979.

Investing in manufacturing excellence
UAS Labs, also known as The Probiotic Company, is built upon its probiotic-only manufacturing facilities. Since UAS Labs' CEO Kevin Mehring and CSO Dr Greg Leyer took charge in the company in 2013, they have made a considerable investment to ensure the stability and viability of their probiotic solutions. Most recently UAS Labs announced a 60-million-dollar investment with the opening of their new fermentation facility in Madison, Wisconsin, USA. This investment was made to support their continuous growth and ongoing leadership position in the probiotic marketplace. As true pioneers in the industry, the team at UAS identified the opportunity for a fermentation manufacturer that was able to successfully commercialize a growing list of probiotics—both traditional species as well as strains recently discovered by their global partners. Pacing their team of probiotic experts, with a facility engineered for product purity, UAS has the capacity to not only produce these strains commercially but also improve on standard industry lead-times.

Like the fermentation facility, UAS has a 45,000-square-foot facility in Wausau, Wisconsin, USA dedicated solely to the manufacturing of probiotic finished goods. This facility is yet another testament to UAS Labs' focus on probiotics. Whereas mixed-use sites need to cater to the needs of a range of types of products, every design and process decision at UAS Labs' facilities are made to best serve the unique characteristics of probiotics. As live microorganisms, each with their own requirements throughout production and distribution, probiotics place particular pressures on manufacturers. UAS Labs' investment priorities demonstrate its commitment to ensuring optimal handling of these microorganisms.

At each step in the process from fermentation to distribution, UAS Labs seeks to create the optimal environment for probiotic viability. This degree of end-to-end control is made possible by the fully-integrated nature of UAS Labs, which enables it to maintain standards from the production of raw materials through to shipping finished products. While they have made large investments in their physical facilities, the real investment was made with probiotic partners and end-consumers in mind. UAS Labs will use their probiotic-only manufacturing facilities to drive their mission of providing leading and trusted probiotic-based solutions through the creative application of science, quality and talent in mind.

Overcoming formulation challenges
UAS Labs, a provider of private label, contract manufacturing and raw materials services, has paired its production capabilities with substantial R&D and quality control operations. This combination yields benefits for UAS Labs and its customers.

If a contract manufacturing organization (CMO) comes to UAS Labs with a recipe and ambition to turn it into a product, the R&D team will assess various aspects of the formulation. Sometimes the formulation needs work if it is to be commercially viable, and this is when working with a partner with expertise and proprietary technologies pays dividends.

UAS Labs is particularly well equipped to manage the water activity of secondary materials. While the characteristics of the probiotic are set in stone, the optimization of the secondary materials used in the final product provide an opportunity to increase the viability of the formulation.

Recognizing this, UAS Labs has developed proprietary technologies to reduce the water activity of materials that would otherwise fail to meet its requirements. This permits the use of a wider range of materials than would otherwise be possible.

Once UAS Labs has a formulation that looks viable, it makes a small batch for use in stability tests. These tests use UAS Labs' stability-assessment chambers, another resource in which the firm has invested. UAS Labs now has six stability-testing chambers. Products UAS Labs may take months to go into the chambers and are tested monthly or quarterly to gauge their long-viability. This way, UAS Labs can continuously review and improve the shelf life of its products.

Clinical trials and documented strains
The focus on scientific excellence that characterizes UAS Labs' R&D team stems, in part, from their CSO, Dr Leyer is a primary researcher who specializes in probiotic efficacy and applications. He directs the R&D laboratory and UAS Labs' clinical trial activities. The capabilities of the R&D laboratory and the very existence of the clinical trial program are testament to the commitment of UAS Labs to the advancement of scientific understanding of probiotics.

Few manufacturers conduct gold-standard clinical trials of probiotic strains and finished formulations. UAS Labs is part of this elite group. The company's investment in clinical trials reflects its desire to further scientific understanding of probiotics and its belief that data from rigorous human studies will become increasingly important to ensure customers are receiving the best possible products backed by rigorous science.

The goal of UAS Labs' study program is to put a substantial portion of private label formulations through double-blind, placebo-controlled randomized clinical trials. By doing so, it will generate data on finished product formulations. As UAS Labs does business in over 45 countries, it operates in markets where such data is needed today.

UAS Labs has a track record of successfully running clinical studies as shown with three of their trademarked superstrains:

- Lactobacillus rhamnosus R1 (LRC®) is the world's most effective and clinically documented heart health probiotic strain
- Lactobacillus acidophilus DDS-1 is arguably the best described probiotic species with over four decades of clinical research
- Lactobacillus gasseri BNR17™ is a weight management strain that has been put through extensive pre-clinical analysis and is the subject of three published human clinical studies. These superstrains, exclusively offered by UAS Labs, are recognized throughout the industry for their science. In fact, Lactobacillus gasseri BNR17™ was just awarded Weight Management Ingredient of the Year, 2018 based on its scientific data and ability to meet a market demand.

With nearly 40 years in the probiotic industry it would be easy for UAS Labs to rely on longevity for success, but that is not the case! UAS continues to use their experience and expertise to advance the field of probiotics. They adapt operations to the ever-changing landscape and remain at the forefront of clinical advancement.

Today, with expertise, science and state-of-the-art facilities in place, UAS Labs is as well-equipped as ever to continue breaking new ground in probiotics and meeting the needs of their strategic partners.
Nutraceuticals now

The effect of time on skin health

Aging is a complex, multi-factorial physiological process that affects all organs, but changes to the skin remain the most visible mark of passing time. The skin also reflects health and well-being. Along the years, as one gets older the skin loses its elasticity, forms wrinkles and pigmented lesions start appearing. But more than a cosmetic issue, skin aging and poor skin health may expose the body to significant health risks, since the skin is the first line of defence from external forces. Skin protects our body from UV radiations, infectious microorganisms, and mechanical and chemical stress. Healthy skin is also vital to regulate body temperature, synthesize optimal amounts of vitamin D and provide critical sensory input from the environment.

The human skin consists of epidermis, corium and tela subcutanea. The epidermis is made of four layers, namely stratum corneum, stratum granulosum, stratum spinosum and stratum basale. With passage of time, studies show that the moisture content of the stratum corneum (epidermal layer) decreases. In the aged population, the stratum corneum is also susceptible to inflammation and infection. In vivo and human studies show that aged skin suffers alterations in epidermal integrity and recovery after experimental perturbations. This reduction of structural integrity is partly explained by a decrease in lipid content of aged skin, up to 32 % compared to young skin. Skin lipids are primarily composed of ceramides, fatty acids and cholesterol, and the synthesis of these vital lipids gradually decrease with age.

Why does our ageing skin need additional ceramides?

Ceramides represent about 40-50 % of stratum corneum and are formed from a sphingosine backbone and a fatty acid (Figure 1). They are key constituents of epidermal membrane and contribute to the maintenance and integrity of the permeability barrier. Together with cholesterol and saturated fatty acids, ceramides create a water-impermeable, protective structure to prevent excessive water loss due to evaporation as well as a barrier against the entry of external entities such as microorganisms. Ceramides and their metabolites are also involved in the modulation of key cellular functions such as proliferation, differentiation and apoptosis in epidermal keratinocyte cells. Quantity of ceramides is lower in the stratum corneum of aged individuals, and patients with atopic dermatitis and dry skin.

The forearm skin of the aged (especially those over 70 years old) is usually xerotic, due to a decrease in ceramide content which is associated with dry appearance. In addition, comparison of total ceramides content of forearm stratum corneum between patients with atopic dermatitis and healthy subjects shows that in atopic dermatitis, there is a marked reduction in the amount of total ceramides in both lesional and nonlesional forearm skin. Levels of ceramides 1 and 3 are particularly lower in atopic dermatitis patients with moderate atopic dermatitis, ichthyosis, xerosis and acne. This result suggested that ceramide is a key factor for moisture maintenance and barrier function of stratum corneum. Fine lines and wrinkles appear when ceramide content is reduced.

Supplementation with ceramides

Studies confirm the gradual decline of the ceramides content in human skin due to aging, possibly due to a decline in enzyme activity that helps to deliver ceramides in usable form to the skin. When aging skin’s ability to make ceramides diminishes, as it inevitably does, increased ceramides intake becomes necessary. Several studies showed that supplementation with ceramides may improve deteriorated skin conditions. Indeed, topical applications of stratum corneum lipids and ceramides were reported to restore skin barrier, to alleviate dry skin and to repair skin. Clinical studies reported the usefulness of ceramides supplementation in treating atopic dermatitis and eczema.

Ceramides, naturally present in animal skin, are also produced by some plants, and vegetal cereamides were also reported for their benefits on skin health. For example, in a RCT trial involving 51 women aged 20-63 years, a significant increase in skin hydration and an improvement in associated clinical signs were observed in women with dry skin after 3 months treatment with a wheat extract rich in ceramides. Another clinical study on 35 women showed that oral intake of beef ceramides improves skin elasticity in a dose dependent manner and may stimulate intracellular signals and exert favourable effects on the extracellular matrix, such as induction of fibronectin synthesis. Administration of glucosylceramides to mice was also shown to be useful in restitution of transepidermal water loss and for improvement of skin barrier function by up-regulating genes associated with the cornified envelope and tight junction formation.

SkinCera™, a patented konjac extract standardized for ceramides by Vidya Herbs

SkinCera™ (Amorphophallus konjac) is a plant from Araceae family native to a wide region from warm subtropical to tropical eastern Asia, where its flour is widely used as a food source. In China, it has been used for more than 2000 years in the treatment of asthma, cough, hernia, breast pain, burns as well as haematological and skin disorders. Konjac is rich in polysaccharides namely glucuronamannan, and is reported to have anti- Obesity, anti-hyperglycaemic, anti-hypercholesterolaemia activities, laxative effects, and prebiotic and anti-inflammatory activities. Konjac glucosamannan hydrolysates are also reported to improve skin health by promoting the topical immune response and collagen regrowth at cuts, and by preventing and protecting against infections, such as P. acnes. A clinical study reported the benefits of konjac formulation containing 5 % glucuronamannan on acne vulgaris and skin health. Besides, the intake of 1.8 mg/day of konjac cereamides by children with moderate atopic dermatitis improves skin symptoms and allergic responses. Oral intake of konjac glucosylceramides is also reported to improve the level of transepidermal water loss,4,5 skin tone and health of subjects.

SkinCera™ by Vidya Herbs is an ethanolic extract of konjac rhizomes standardized for 5, 10 or 20 % glucosylceramides, among them ceramides 1, 2, 3 and 4 are the major compounds (Figure 2). SkinCera™ is a potent nutraceutical product useful to maintain skin health and the skin lipid barrier, for which a patent was deposited. In in-vitro and in-vivo studies SkinCera™ showed moisturizing effects and was proven to fight the signs of aging, by the inhibition of 3 key enzymes: tyrosinase, elastase and collagenase.

Anti-tyrosinase, anti-elastase, anti-collagenase and moisturizing effects of SkinCera™

Tyrosinase is a copper containing oxidase found in melanocytes, and is a key enzyme in melanin biosynthesis, a pigment formed from o-dopaquinone polymerization. Melanin is responsible for dark spots on the skin in middle-aged and elderly individuals and of hyperpigmentation involved in several dermatological disorders such as melanoma, solar lentigines and ephelides. Therefore, tyrosinase inhibitors may be clinically used for the treatment of some skin disorders associated with melanin hyperpigmentation and are also important in cosmetics for skin whitening effects. SkinCera™ was proven to inhibit mushroom tyrosinase in-vitro (50 % inhibition at 100 μg/mL) and to have high affinity with the enzyme in a molecular docking study (Figures 3 and 4A).

Elastase and collagenase are key enzymes involved in the degradation of the extracellular matrix. In particular, they cleave elastin and collagen, responsible for skin elasticity and skin tensile strength respectively. Compounds having anti-elastase and anti-collagenase properties may consequently help to prevent age-associated destruction of elastin and collagen, which cause visible signs in aged skin such as wrinkles and sagging. SkinCera™ was proven to inhibit elastase and collagenase (Figure 3). To have affinity to the two proteins, SkinCera™ showed moisturizing effects and was proven to fight the signs of aging, by the inhibition of 3 key enzymes: tyrosinase, elastase and collagenase.

Figure 1: Generic structure of ceramides

Figure 2: LCNAS analysis of konjac extract

Figure 3: In vitro anti-tyrosinase, anti-elastase and anti-collagenase activities
Bühler's new data-driven optical sorter, for minimising aflatoxin contamination in maize – with cloud connection for data-analysis.

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SEPIBLISS™ is a science driven, nature inspired and consumer relevant ingredient

With a strong expertise in skin biology and a deep knowledge of the cosmetic market, SEPPIC has been a pioneer in nutricosmetics. Anticipating food supplement brands need and consumer’s expectations SEPIBLISS™ has been designed as the first oral natural ingredient dedicated to sensitive skin. SEPIBLISS™ is a virgin coriander seed oil. It is locally produced in the South West of France and its manufacturing process does not involve any solvent. It contains no additives and is suitable for vegetarian, kosher and halal diet. It has been inspired by nature and tradition, as coriander has been a widely used spice and medicinal plants, from the Egyptians to today trendy cuisine, for its subtle flavor and its active phytochemical components. SEPIBLISS™ has a standardized fatty acid profile with a high concentration (minimum 60%) of the rare petroselinic acid, it also contains linoleic acid, phytosterols and vitamin E.

SEPIBLISS™ has been developed to offer a comprehensive soothing effect for sensitive skin: reducing skin reactivity to skin stressors via a neuro-soothing action and an anti-inflammatory action, and better protecting the skin against skin aggressions, via an anti-inflammatory and a barrier reinforcing action.

As the first nutricosmetics ingredient specifically targeting skin reactivity, SEPIBLISS™ offers opportunities to develop new food supplement formula dedicated to soothing and reducing symptoms of skin reactivity or more classic nutricosmetics formula (hydration, anti-aging, UV, glowing) that are specific for sensitive skin.

Neuro-soothing action

Sensory neurons are able to collect information at skin level. They have receptors implicated in the perception of itch and pain, also called nociception. One of them, TRPA1 is activated by various irritants like isocyanates, acrolein from smokes, ozone and carbon oxides, by bacterial endotoxins, by cold temperatures and by reactive oxygen species. TRPA1 is a trimeric G-protein coupled receptor.

The neuro-soothing effect of SEPIBLISS™ was assessed in an in vitro assay on human keratinocytes-neurons co-culture model. Neurons were stimulated and TRPA1 activated by AITC. SEPIBLISS™ and AITC the protection against this activation by SEPIBLISS™ was evaluated.

SEPIBLISS™ at 0.001% allowed a significant protection of keratinocytes-neurons co-culture from AITC activation by 61%. These results would suggest that SEPIBLISS™ could reduce pain sensation, itching and neurogenic inflammation.

Anti-inflammatory action

In the epidermis, keratinocytes are the first cells encountered by external stimuli and they are able to promote an inflammatory response by increasing the production and the release of various soluble factors, such as cytokines, chemokines (like TNF-α for example) and anti-microbial peptides. Several transcription factors can be activated by such stimuli. Among them, one of the most studied inflammation-activated transcription factors is Nuclear Factor (NF)-κB. NF-κB modulates the expression of genes involved in inflammatory and oxidative stress response. This natural reaction to aggressions induces well known symptoms like redness and heat sensations.

The anti-inflammatory effect of SEPIBLISS™ was assessed in vitro assay on keratinocytes inflammation model.

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Frutarom enters “Beauty from Within” market in Asia
Pure tomato powder-derived ingredient backed by research boosts skin health and radiance

Frutarom enters the “beauty from within” market with PhytoflORAL®, a patented clinically studied cosmeceutical that gives skin a light, even tone and promotes skin health. It was developed by IBR, Ltd., Israel. Frutarom will showcase PhytoflORAL® at Vitafoods Asia in Singapore, September 11–12, 2018, at booth #H22.

PhytoflORAL® is composed of a proprietary ingredient derived from non-GMO tomatoes rich in the colourless carotenoids, phytoene and phytofluene. It is available as a free-flowing, all-natural powder that can be used in multiple applications, including capsules, chewable tablets, drinks and pre-mix sachets.

“PhytoflORAL® is composed of a proprietary ingredient derived from non-GMO tomatoes rich in the colourless carotenoids, phytoene and phytofluene. It is available as a free-flowing, all-natural powder that can be used in multiple applications, including capsules, chewable tablets, drinks and pre-mix sachets. The recent acquisition of IBR by Frutarom opened a new market of cosmeceuticals, with prospects for rapid growth and added value,” says Yoni Glückman, President of Frutarom Natural Solutions. “IBR brings innovation and all-natural solutions backed by research that perfectly fit into our portfolio.”

Clinical data show that dietary intake of phytoene and phytofluene results in the accumulation of these phytochemicals in the skin, delivering multiple skin-health and beauty benefits. These include protection against oxidative damage and sun exposure, as well as capabilities to brighten skin and even out complexion. Moreover, these compounds possess inherent anti-aging properties for skin. These carotenoids inhibit melanin synthesis and control pigmentation through natural mechanisms, assist protecting from UV and oxidative damage, while concurrently reducing inflammation and DNA damage.

In many cultures flawless skin is correlated with luxury and well-being, while even-toned skin is universally translated into a healthier and more youthful appearance.

“Asia Pacific is one of the top markets for beauty from within ingredients,” explains Liki von Oppen-Bezalel, Ph.D., VP of Business Development and Marketing for IBR. “Multiple skin health ingredients, especially so-called ‘skin-whitening’ materials, are unsafe for use. This is why it was vital to develop a safe, research-backed natural ingredient like PhytoflORAL®.” PhytoflORAL® has been subject to a number of clinical and in vitro studies that demonstrate its bioactivity. Efficacy was further elucidated through gene expression analysis. In one clinical study, PhytoflORAL® presented a significant photoprotective effect after 84 days of supplementation, as indicated by a 20% increase in Minimum Erythemal Dose (calculates shortest exposure to UV radiation before reddening of the skin) in 65% of participants. Another study demonstrated a measurable skin-lightening effect in 82% of subjects noticeable after 42 days, and increasing after 84 days. In addition, subjects reported enhanced skin radiance, evenness, hydration, and suppleness, and found their skin to be visually healthier and more resistant to sun damage.

IBR developed complementary ingredients to PhytoflORAL® for topical use. These products also are rich in phytoene and phytofluene, and available for dual “beauty from inside and outside” regimes.

The global active ingredients market for cosmetics was valued at approx. US$2.63 billion in 2015. It is projected to reach US$4.45 billion by 2026, as reported in Markets and Markets. The primary drivers for this acceleration is increasing awareness among consumers toward skin health and rising demand of consumers to look good. The trend is especially strong in Asia and South Africa. This awareness is generating a significant demand for cosmetics and personal care products, particularly those for anti-aging, skin-tone evening, and sunscreen. The demand for natural, “green,” environmentally friendly cosmetic products is likewise increasing.

According to recent US survey [1] conducted on 450 participants, for consumers of vitamin and sports nutrition products, health maintenance and immunity are by far the two first drivers of the purchase decision (Fig. 1). When it comes to choice, ingredients listing and functionality claims are by far the most important for those health-minded consumers who are hungry for information and read about product functionality and efficacy. Sports nutrition is a booming market and while there is a need for well documented ingredients with targeted functionalities, probiotics are well positioned to meet this market.

**Sport and immunity**
When gaining in intensity, exercise can be the source of physiological and psychological stress and the body’s natural defences can be impaired. The relationship between the intensity of exercise and immunity is a J-shaped curve (Fig. 2). It appears that people are more prone to bacterial and viral infections following intense training. This phenomenon can last for up to 72 hours [2]. Lowered immunity, combined to hyperventilation that naturally occurs during exercise, contributes to a higher susceptibility to upper respiratory tract (URT) disorders in sportsmen and women. URT infections (URTIs) are a common cause for missing training or even a competition and can affect performance.

The benefits of certain probiotic strains on immune defenses is now well described. One particular strain, Lactobacillus helveticus Lafti® L10, has been clinically tested in athletes and shows immune support benefits.

A clinical study was published in 2016 that confirmed the benefits of Lactobacillus helveticus Lafti® L10 in training athletes during winter [3]. Based on this and previous clinical studies, the Canadian health authorities (Health Canada) has granted 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” for this unique probiotic strain. The 39 elite athletes enrolled in this study were aged 18-28 years, training for over 11 hours per week in various sports and followed the probiotic treatment, or placebo, for 14 weeks in winter period. This randomized, double-blind placebo controlled study looked at the severity, incidence and the duration of URTIs episodes using validated scale, and monitored biological immune markers.

The study showed that L. helveticus Lafti® L10 supplementation:
- **Significantly shortened by 3.4 days the average duration of URTIs** (7.25 days with the probiotic vs. 10.64 with placebo, p<0.05) (Fig. 2).
- **Significantly decreased the number of symptoms** by around 29% (4.92 symptoms with the probiotic vs. 6.91 with placebo, P=0.05). URTI severity tended to decrease (P=0.078).
- Increased the self-rated sense of vigor and tended to reduce the proportion of athletes reporting impaired training.
- Moreover, several changes in immune markers have been recorded during the study in the probiotic group: for example, Interferon-y was significantly higher in the probiotic group suggesting a better prevention of infections.

This study reinforces previous findings on the immunological benefits of L. helveticus Lafti® L10 supplementation in athletes it does show that probiotics could help address the increase in URT infection risks linked to training and intense exercise and help support a well-functioning immune system.

The first sport study conducted with same strain was a pre-post intervention study conducted on 450 participants in the US.

**Probiotics can boost sports nutrition**

![Figure 1](image1.png)

*Figure 1. The relationship between intensity of exercise and infection risk (Niemann, 2008).*

![Figure 2](image2.png)

*Figure 2: The relationship between intensity of exercise and infection risk (Niemann, 2008).*

![Figure 3](image3.png)

*Figure 3: Effect of the probiotic treatment on average infections duration (URTI) (Marnikovic et al., 2016).*
studies in digestive health [9]. Thus, probiotics can appear as intestinal discomfort for example. This in turn can impact gastro-intestinal health, as we are now aware. After three weeks of daily administration of the probiotic, two important stress-induced gastrointestinal symptoms, nausea and abdominal pain, were significantly reduced by half compared to the placebo group. This study indicated that the probiotic could bring benefits to chronic stress sufferers, reducing significantly gastro-intestinal symptoms of stress. Later on, another clinical study [12] assessed the effect of this probiotic combination on psychological symptoms of stress, using tests commonly used to evaluate anxiety and depression. These positive results were verified by the decrease of the biomarkers (Cortisol).

In conclusion, specific probiotic strains can represent novel approach to sports nutrition. Their ability to help restore and maintain microflora balance and natural defenses can lead to respiratory tract protection, alleviation of exercise-induced gastro-intestinal disturbance and the effects of stress in active people, from professionals sportsmen to everyday’s life athlete.

References
1. Drug Stone News; ECRM; Hellawella 2015 (US consumer conducted on 450 people).

The role of digestive microflora and probiotic supplementation on the brain-gut axis has recently gained momentum [10]. In 2008 was published the first clinical trial linking probiotics to chronic stress symptoms. A double-blind, placebo controlled, randomized study [11] was conducted over a 9-week period in chronic stress sufferers to compare the effects of a specific probiotic preparation (Lactobacillus helveticus Rosell®-52 and Bifidobacterium longum Rosell®-175) in a stick format - probiotic patch. After three weeks of daily administration of the probiotic, two important stress-induced gastrointestinal symptoms, nausea and abdominal pain, were significantly reduced by half in the probiotic group as compared to the placebo group. This study indicated that the probiotic could bring benefits to chronic stress sufferers, reducing significantly gastrointestinal symptoms of stress. Later on, another clinical study [12] assessed the effect of this probiotic combination on psychological symptoms of stress, using tests commonly used to evaluate anxiety and depression. These positive results were verified by the decrease of the biomarkers (Cortisol).

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References
1. Drug Stone News; ECRM; Hellawella 2015 (US consumer conducted on 450 people).
Shifting the focus from carb utilisation to fat burning
Most popular sports nutrition drinks, gels and bars on the market today have been designed to increase energy during exercise, yet these products traditionally contain high glycaemic carbohydrates like maltodextrin, glucose syrup and sucrose. Such carbohydrates release glucose into the bloodstream at a fast rate. This is fine for those in need of instant energy for intensive athletic training, such as sprinting. However, for casual fitness users looking to tone their bodies and reduce fat, high glycaemic products can trigger large peaks and troughs in blood glucose and insulin levels during physical training, minimising not maximising their fat burning potential.

With this in mind, today’s high glycaemic sports nutrition products are not suited to the needs of casual fitness users, or those beginning to exercise. The ideal sports nutrition product for those looking to burn fat and tone whilst exercising needs to be one which contains a low glycaemic carbohydrate and has a lower impact on blood sugar levels.

A low glycaemic carbohydrate such as BENEO’s Palatinose™ (isomaltulose) is ideal for use in sports nutrition products, as it has a balanced effect on blood sugar levels and is fully digestible. It provides full carbohydrate energy in a sustained way, eliminating unwanted “boost and crash” blood sugar spikes and it helps to burn fat more effectively. An increased fat burning rate also means that active consumers can draw on their carbohydrate reserves for longer. These physiological benefits make Palatinose™ ideal for use not only in products aimed at endurance athletes but also for those targeted at casual fitness users or for those who are beginning to get active.

Is there a wider market for sports nutrition products?
Research analysts from Globaldata recently commented that next to elite athletes and bodybuilders, there has been an increase in casual fitness users looking to supplement an active, healthy lifestyle with sport nutrition products. At present, despite the high prevalence of obesity, there are few products targeting obese or overweight consumers. However, Globaldata predicts this will change and we will see more product launches aimed at the overweight, as well as women and older consumers.

Expanding waistlines
The prevalence of obesity nearly doubled between 1980 and 2014 and this figure continues to rise. Governments worldwide are working hard to encourage those who are overweight or obese to get active. However, at present, the majority of sports nutrition products on the market do not support weight management in this group as they contain high glycaemic ingredients that inhibit fat burning rather than support it.

Ageing populations
Another group that is highly motivated by products that help them manage their weight is the older consumer. With 11.6 million people aged 65 or over in the UK alone and a quarter of the population of Europe expected to be 60 years or older by 2020, developing and marketing products for this consumer group makes business sense. Especially considering that many of these older consumers have high purchasing power and are increasingly interested in their health and wellbeing.

Essentially versatile
The functional benefits of a product alone often aren’t enough for it to become a regular feature in consumers’ shopping baskets. Good taste and texture are essential if a product is to become a favourite with purchasers. In fact, figures from a recent study by LightSpeed GMI and Mintel showed that 65% of UK consumers would swap a normal snack for a sports nutrition product, but only if it tasted similar, while nearly 50% said that they would consume sports nutrition food and beverage as part of their everyday diet.

With this in mind, carbohydrate ingredients need to be able to deliver in terms of technical, as well as nutritional and functional benefits. BENEO’s Palatinose™ has a natural, mild sugar-like taste and sweetness and is ideal for use in gels and bars, as well as drinks. As a very low hygroscopic, free-flowing powder, it is ideal for powder instant beverages or agglomerates and it significantly reduces the water absorption in blends, minimising the risk of common production issues such as caking and lumping. Since it does not absorb humidity from the environment, convenient handling throughout its shelf-life is guaranteed. It is not easily hydrolysed by acids due to its strong molecular link, ensuring beverages to which it is added are able to retain a stable ratio of solute particles, as in the case of isotonic drinks.

Putting it into practice
Specialists at the BENEO-Technology Center conduct regular recipe trials that undergo stringent sensorial evaluation, to ensure that BENEO ingredients can deliver in terms of performance, taste and texture. In recent recipe formulation trials, Palatinose™ was used to create a reduced glycaemic response sports drink powder. The end result was a powder that delivers exceptional results in terms of having a sugar-like taste, is dissolvable in cold water and has excellent flowability and dispersability.

With obesity rates set to rise over the next five years and the population ageing, the demand for products that promote fat burning and weight management shows significant growth potential. The BENEO-Technology Center has developed a wide range of new product concepts including drinks, foods and gels to meet these needs. Sports nutrition is moving beyond the realm of just the elite athlete and now, thanks to Palatinose™, there is a functional carbohydrate available to meet the needs of the casual fitness user.

References
1 Source: Innova 2018
2 Globaldata 2017
3 Source: World Health Organisation
BRIDGING THE FIBRE GAP

Monica Schmitz-Hübsch, European Senior Marketing Manager Wholesome, Sweetness and Nutrition at Ingredion EMEA, looks at how the food industry can increase the fibre content of foods to improve the population’s fibre consumption and meet the growing consumer demand for products with high fibre claims.

A growing trend

Consumer interest in health and wellness is at an all-time high. For the food industry this takes many forms, and while for fat and sugar it is about reducing consumption, when it comes to fibre the opposite is true. More is definitely better.

It is known that most western populations still fall short of the recommended fibre intakes despite fibre being often cited as one of the top five ingredients or benefits looked for by consumers*. In 2015 the UK’s Scientific Advisory Committee on Nutrition (SACN) recommended an increase in the population’s fibre intake to 30g per day for an adult. In Germany 30g has been the recommended limit for a number of years. This level is seen as important for achieving a healthy balanced diet which reduces the risk of developing a range of chronic diseases.

At EU level, resistant starch has been included in the harmonised definition of dietary fibre since 2008. Along with raising the recommended daily intake (RDI) of fibre, SACN also confirmed resistant starch as a key dietary fibre along with other dietary fibres like lignin and oligosaccharides. This highlights how there is both a need and an opportunity for our industry to find ways to improve the fibre content in recipe formulations and to help bridge this so-called ‘fibre gap’.

Fibre is a recognisable and consumer-friendly term. Consumers are also aware of its health benefits such as improving digestive health, managing blood sugar levels, lowering cholesterol and supporting weight loss. These are all positive associations and we know that claims such as ‘source of fibre’ and ‘high in fibre’, have an impact on consumer choice.

In a study of European consumers questioned stated a ‘high in fibre’ claim was very important when making purchasing decisions, ahead of ‘wholegrain’ and ‘high in protein’ claims.

For a product to secure a ‘source of fibre’ claim, a ratio of three grams of fibre per every 100 grams is required, rising to six grams for a ‘high in fibre’ claim as defined and regulated by Regulation (EC) 1924/2006 on nutrition and health claims. Being able to draw on wider forms of fibre, such as resistant starches, means that these types of claims are more readily achievable across a variety of applications.

A recipe for success

This begs the question, are there particular applications and food categories that are more suited to a fibre claim, both in terms of consumer expectation and also processing capability? For consumers, there is perceived to be a natural affinity between baked goods such as bread, cereals and pasta, where a large proportion of the recipe might be flour, wheat, rye or oat-based, and a fibre claim. These low moisture applications require a fibre ingredient that can offer a low water-holding capacity to ensure the processability is moisture applications.

There are also bakery products that have until now proven more difficult to improve the fibre content of, such as white breads, cereals, cakes and muffins, due to consumer expectation and preferences as well as the availability of ingredients. Resistant starches, however, such as Ingredion’s HI-MAIZE® 260, which has a resistant starch content of 60%, significantly improves its nutritional value and provides a ‘high fibre’ claim while maintaining the same appearance, taste and quality of bread and improving shelf-life stability. Similarly, breakfast cereals and nutrition bars can benefit from a resistant starch that offers a similar water holding capacity to wheat flour, making it suitable for low moisture applications.

Making a claim

Raising the fibre content of food products by incorporating resistant starches can also allow food manufacturers to apply a health claim as well as a fibre-related one. Consumers respond well to front-of-pack claims such as ‘help maintain healthy blood sugar levels’ and ‘reduced glycaemic response’, especially given the rising incidence of type-II diabetes and the lifestyle trend towards following fuller or longer diets. A recent comprehensive review by the British Nutrition Foundation (BNF), ‘Health effects of resistant starch’, also revealed that resistant starch possesses positive properties as a healthy food component which is encouraging. There is also emerging science indicating that resistant starch may also help with insulin resistance, a precursor of diabetes and thus may help to reduce the risk of developing diabetes mellitus.

Ingredients such as resistant starch that are able to combine an approved health claim with easy-to-use resistant starch enables manufacturers to use naturally occurring.

There are also bakery products that have until now proven more difficult to improve the fibre content of, such as white breads, cereals, cakes and muffins, due to consumer expectation and preferences as well as the availability of ingredients. Resistant starches, however, such as Ingredion’s HI-MAIZE® 260, are an ‘invisible’ type of high fibre. They can simply be used to directly replace a significant part of the flour, making it easier to use than other types of fibre.

The very small particle size of the starch, as well as its neutral flavour and white colour, make it possible to add hidden fibre goodness without affecting the quality and appearance of a baked good. This is an excellent way to enhance the nutritional content of indulgent but nutritionally-low baked goods, such as cookies and savoury snacks, and in wider applications areas including products for children, without impacting overall consumer appeal. It is also relevant to the growing gluten-free sector where historically products were perceived to be of poor nutritional value and difficult to process.

As, for example, HI-MAIZE® 260 resistant starch is naturally gluten-free and easy to incorporate, it is a good way to produce high quality, nutritionally improved gluten-free baked goods.

It is also a recognisable ingredient, listed simply as ‘starch’ on the label, and therefore supports a clean label approach.

In addition to raising the suggested fibre intake for adults, for the first time the UK’s 2015 SACN report introduced guidelines for those under 16 years in an attempt to increase intakes of fibre among children. This is another example of where ‘invisible’ fibre can have a positive effect. For example, formulating a white bread using HI-MAIZE® 260, which has a resistant starch content of 60%, significantly improves its nutritional value and provides a ‘high fibre’ claim while maintaining the same appearance, taste and quality of bread and improving shelf-life stability. Similarly, breakfast cereals and nutrition bars can benefit from a resistant starch that offers a similar water holding capacity to wheat flour, making it suitable for low moisture applications.

Recent recommendations have shown there is a general need to increase the levels of dietary fibre consumed as part of a healthy diet across the population. Alongside this, the decision by the UK’s 2015 SACN report to include resistant starch within the dietary fibre calculations is a positive, opening up many new opportunities for the food industry to develop new recipes using ingredients that are high in fibre, nutritious and easy to formulate.

*Nielsen Global Health and Wellbeing Survey, Q3, 2014

Reference

1 Regulation (EC) No. 432/2012 of 16 May 2012, establishing a list of permitted health claims made on foods, other than those referring to the reduction of a disease risk and to children’s development an health. OJEU. L 136/1.
Human milk oligosaccharides, not only for breast-fed babies

By Dr. Katja Parschat, Deputy Head of R&D at Jennewein Biotechnologie GmbH

Human milk oligosaccharides (HMOs), comprise more than 150 different sugar molecules whose effects on infants’ development have been the subject of intense research over the last decade. Breast-fed infants consume 15 grams of HMOs per day on average. The concentration and composition of HMOs in human milk vary during the period of lactation and is adapted to the needs of the child at each stage of development. The simplest HMOs are tri-, tetra-, or penta-structures (three-sugar residues) formed by linking the disaccharide lactose to fucose, sialic acid, or N-acetylgalactosamine. More complex HMOs are based on tetrasaccharide core structures (four sugar residues), in which lactose is extended with units of lacto-N-biose (yielding lacto-N-tetraose) or acetyllactosamine (yielding lacto-N-neotetraose). Both of these structures can be decorated with fucose and sialic acid or extended by adding more galactose or N-acetylgalactosamine residues to make even more complex HMOs.

One of the key benefits of HMOs during human postnatal development is their promotion of a healthy gut microbiome. This community of microbes – mainly bacteria – is so large that it exceeds the number of human body cells (which number in the trillions). Microbes are found throughout the human intestinal tract but are particularly concentrated in the colon. A well-balanced microbiome contains beneficial bacteria that have a positive effect on health, for example by providing enzymes for food digestion or the synthesis of vitamins, whereas a poor microbiome can become overrun with pathogens that cause severe diseases like infectious diarrhea or tissue inflammation. The gut microbiome begins to form before birth when the fetus swallows amniotic fluid containing bacteria to some extent [1]. However, this preliminary microbiome is vastly restructured during birth and in the subsequent days, when the neonate is first exposed to bacteria in the birth canal and then to additional microbes in the environment.

After birth, diet is one of the most important factors that affect the composition of the gut microbiome. Breast milk promotes the growth of so-called pioneer bacteria, such as Bacteroides fragilis, Bifidobacterium infantis and Lactobacillus acidophilus, whereas formula-fed infants mostly lack these bacteria [2]. The explanation for this phenomenon is that HMOs, which are not present in typical formulas, are used by these pioneer bacteria as a source of energy. For example, B. infantis and other bifidobacteria are equipped with specific proteins and enzymes allowing the uptake and metabolism of structurally different HMOs, particularly the fucosylated HMOs 2′-fucosyllactose, 3′-sialyllactose and diacetyl lactosamine (3′SL). In human breastmilk, 80% of lactating mothers is 2′fucosyllactose, whereas the other 20% are known as non-secretors because they lack the enzyme α1,2-fucosyltransferase which is required for the synthesis of 2′fucosyllactose and other HMOs containing an α1,2-epitope, such as lacto-N-neotetraose [1, 2]. Accordingly, bifidobacteria become established more frequently and earlier in the breast-fed infants of secretor mothers compared to those of non-secretor mothers [6].

The abundant presence of bifidobacteria is highly beneficial for the gut microbiome and contributes to the growth of beneficial bacteria. For example, bifidobacteria can utilize 3′-sialyllactose as an energy source. For example, bifidobacteria can utilize 3′-sialyllactose as an energy source.
colostrum attenuate mucosal inflammation reactions in the neonate and support the maturation of the intestinal mucosal immune system in newborns [22,23]. One recent clinical study revealed that the cytokine profile of infants fed exclusively on formula containing 2′-fucosylactose and GOS was identical to that of breastfed infants, but differed significantly from that of infants fed exclusively on formula containing only GOS [24]. A very recent study has shown that dietary 2′-fucosylactose directly attenuating LPS-induced inflammation. Gut. 2014: gutjnl-2014.

Table 1. Bacterial and viral pathogens inhibited by human milk oligosaccharides (HMOs) [20]

Pathogen | HMO | Function
--- | --- | ---
Bifidobacterium bifidum and Bifidobacterium cricadactus grown in media supplemented with 3′-sialyllactose modulate virulence gene expression in E. coli outgrowth. The results contradict the hypothesis that the expression of virulence genes in E. coli is related to the ratio of sialic acid to galactose in the lactose chain. Frontiers in microbiology. 2016: 1-7.
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Lactobacillus casei and Bifidobacterium bifidum grown in media supplemented with 3′-sialyllactose modulate virulence gene expression in E. coli outgrowth. The results contradict the hypothesis that the expression of virulence genes in E. coli is related to the ratio of sialic acid to galactose in the lactose chain. Frontiers in microbiology. 2016: 1-7.

Ingredia is a French dairy company that develops and manufactures cutting-edge dairy powders, milk proteins and innovative bioactive ingredients for the food, nutrition and health industries worldwide. Ingredia supports its dynamic growth by continued investments in cutting-edge industrial facilities and scientific research and innovation.

Nutritional proteins

Ingredia’s PRODIET® range, with native, native milk casemorph, milk protein isolate and whey protein hydrolysates allow us to offer to our customers, proteins that meet their needs, with good nutritional and functional benefits. In nutrition, micellar casein is playing an increasingly important role with its scientifically proven nutritional benefits. An optimal amino acid profile and very good chemical score are two important properties much sought after in nutrition and that micellar cases offers. Micellar casein is a slow-digested protein on dry matter.

PRODIET® Fluid is a native milk protein isolate (MPI) in spray-dried powder, naturally rich in native micellar cases, as high as 95%. This unique milk protein contains more than 87% of rat skeletal muscle. It meets the nutrition market. PRODIET® Fluid comes from a non-denaturing membrane filtration process. PRODIET® Fluid enables the development of high protein ready-to-drink beverage while maintaining fluidity. After heat treatment (pasteurisation, UHT), PRODIET® Fluid has a lower viscosity compared to a standard milk protein isolate. Using PRODIET® Fluid, Ingredia’s team achieved a 14% protein ready-to-drink beverage, while maintaining a good taste (milky taste with bitter notes), and the perfect fluid creamy texture.

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- Osteum CPP , Casein phosphopeptides (CPP), is a bioactive peptide that has been shown to help reducing stress-related symptoms. Throughout those studies, made in accordance with OECD guidelines and Good Laboratory Practices, Lactium® has shown no undesirable side-effects, addiction or toxicity.

- Lactium® is a natural ingredient already used worldwide by numerous consumers searching an ally for their daily life. It helps to:
  - Regular chronic stress symptoms (weight gain/ loss, sleep disorders…)
  - Facilitate stressful periods of life (exams, tobacco withdrawal…)
  - Optimize general well-being.

Osteum CPP. Casein phosphopeptides (CPP) is a bioactive milk protein hydrolysate, very rich in CPP with a ratio over 25% 5X 35%. It is produced from our native micellar casein coming from 100% cow’s milk of our French dairy cooperative. Osteum CPP binds calcium and keeps it soluble and bioavailable during digestion. Using CPP supplementation allows to reduce bone mass destruction. It meets particularly children, pregnant/postmenopause women and senior needs.
Sexual activity is an important indicator of the overall health and well-being of men. A healthy and satisfying sex life is closely associated with a healthy lifestyle.

Male sexual performance is mainly evaluated by erectile function.

Sexual function is physiologically correlated with age and also with one’s psychological and emotional state. A decrease of sexual performance could lead to important psychological consequences such as: anxiety, mood and lack of self-esteem, contributing to a vicious circle.

Nexira has recently unveiled impressive new study results.

Nexira’s proprietary formulation activates eNOs, which can increase blood flow up to 50%.

Scientific references:
1 Effect on Nexira’s proprietary formulation (NPF) on the activation of eNOS through the phosphorylation of “Serine 1177” from endothelial cells (HUVECs) as measured by flow cytometry, 2008.
4 The effect of NPF, a formulation containing grape and apple extracts and its effect on the production of peroxinitrites in hamsters subjected to aerobic physical activity. 2004.
GELITA AG joins the Animal Welfare Initiative as a sponsoring member

Bonn, Germany, July 11, 2018 – GELITA AG announces it is joining the Animal Welfare Initiative as a sponsoring member. As of August 1, 2018, the company will support the Animal Welfare Initiative with a financial contribution. By becoming sponsoring members, companies that do not directly sell meat and meat products can help improve animal welfare in livestock farming.

For us, as processors of animal by-products for the production of collagen proteins like gelatins, collagen peptides and collagen, the topic of animal welfare is particularly relevant. Even though the public discussion is primarily focused on the production of meat, due consideration must also be given to animal by-products. Ethical and fair livestock farming is a fundamental building block for the general acceptance of animal products. We firmly believe that the Animal Welfare Initiative is taking the right approach by consciously tackling the topic across the supply chain with large-scale involvement from the industry,” says Reinhard Zehetner, Global VP of Quality and Regulatory Affairs at GELITA AG.

“With GELITA AG, we’ve gained a partner that we can really be pleased with. That’s because GELITA AG proves that the topic of animal welfare is a relevant issue for more and more companies,” says Dr. Alexander Hinrichs, Managing Director of the Animal Welfare Initiative. “GELITA AG is making a statement with its sponsoring membership: the time has come to take responsibility at all stages of the meat supply chain, and the Animal Welfare Initiative offers the possibility of doing this.”

As sponsoring members, companies contribute to creating a more ethical and sustainable meat industry. Companies that are interested in becoming sponsoring members can contact the Animal Welfare Initiative’s office in Bonn.

About GELITA AG

GELITA is one of the world’s leading manufacturers of collagen proteins. With 21 production facilities, it is represented on a continent. Collagen proteins are used as gelatin in the manufacture of food, pharmaceutical products and in technical applications. Collagen peptides are active components in the manufacture of products that counteract joint and skeletal problems, build muscle, reduce weight and reduce wrinkles.

With a workforce of over 2,500 employees, the company achieved revenues of €709 million in 2017. The GELITA Group’s management team is based in Eberbach, Germany. GELITA is an active supporting member of the Rhein-Neckar metropolitan region and is ranked in the Top 100 Innovative Companies.

About the Animal Welfare Initiative

The Animal Welfare Initiative enables leaders in the agriculture, meat, and food retail industries across the supply chain for pork and poultry to live up to their collective responsibility for the proper treatment of animals, as well as animal health and safety in the livestock industry. The Animal Welfare Initiative offers financial support to farmers to implement livestock welfare measures that go above and beyond the legal standards. The implementation of these measures is comprehensively monitored by the Animal Welfare Initiative. Founded in 2015, the Animal Welfare Initiative started its second, equally successful three-year program phase in 2018. The Animal Welfare Initiative is establishing greater animal welfare on a broader level, step by step, and continues to grow.

The Initiative’s shareholders are:
• Zentralverband der Deutschen Geflügelwirtschaft e.V.
• Verband der Fleischwirtschaft e.V. [Association of the Meat Industry]
• Handelsvereinigung für Marktwirtschaft e.V. [Trade Union for Market Economics]
• Bundesverband der Deutschen Fleischwarenindustrie e.V.
• Deutscher Bauernverband e.V. [German Farmer’s Association]
• Deutscher Raiffeisenverband e.V. [German Raiffeisen Association]
• Handelsvereinigung für Marktwirtschaft e.V. [Trade Union for Market Economics]
• Verband der Fleischwirtschaft e.V. [Association of the Meat Industry]
• Zentralverband der Deutschen Geflügelwirtschaft e.V. [Central Association of the German Poultry Industry]

Fruit d’Or Nutraceuticals first to demonstrate a three-year stability for its PACs in whole fruit cranberry powder

This category leader also is the only company guaranteeing a 7% PAC content

“Fruit d’Or whole fruit cranberry powder maintains its natural bright red color over three years with little PAC degradation. No other whole fruit cranberry supplier can say this,” states Stephen Lukawski, CEO of RSSI and lead sales consultant and partner for Fruit D’Or Nutraceuticals.

This news is especially significant because Fruit d’Or is the only whole fruit cranberry powder supplier to link its 7% PAC analysis with anti-adhesion activity, through testing by Rutgers University. “Fruit d’Or has worked diligently to establish a higher standard of quality for whole fruit cranberry powders. Fruit d’Or is using advanced analytical equipment such as Maldi-TOF for identification and authentication, polyphenol fingerprinting, updated reference standards and quantitative testing methods to support its outcome studies,” Lukawski explains. “Through identification, standardization and authentication of your starting cranberry powder, clinical studies can now be repeated and validated. We want companies to understand that Fruit d’Or’s vertically integrated farm-to-table operation delivers consistency and provides quality control from lot to lot.

“We’ve shown that daily dosages of 1 gram of our cranberry powder with a minimum of 7% PACs can help prevent colonization of pathogenic E. coli bacteria. We use the D-MAC test method to measure soluble PACs and the butanol test method to measure insoluble PACs, this why it’s critically important to protect the integrity of the whole fruit cranberry. As a supplier, we do our best to prevent PAC degradation by using state-of-the-art milling techniques and low drying temperatures.” Lukawski cautioned, however, that if manufacturers use excess heat in their tablet or encapsulation process, or don’t store the ingredients properly, it could affect the PACs’ integrity and efficacy. “In addition, adding lubricating agents or other excipients in the manufacturing process could also likely degrade both the soluble and insoluble PACs, and turn the color of the cranberry from red to brown.” He added, “If companies don’t want to show PAC content on their labels, at least indicate the source of the cranberry and conduct real-time anti-adhesion testing to demonstrate the efficacy of your finished product.” It’s about earning the trust of consumers through transparency and by delivering on promise safe and efficacious cranberry products.

To work with Fruit d’Or Nutraceuticals on delivering best-in-class quality cranberry products to consumers, visit www.qualitycranberry.com.
Research-backed ingredients provide product differentiation in crowded sports nutrition market

By Dr. Don Cox, Ph.D., R&D Director – GanedenBC30® and Wellmune®, Kerry

Sports nutrition has gone from niche market to mainstream consumption category. In a crowded and competitive market, research-backed ingredients provide products with the added health benefits that consumers demand while giving manufacturers the differentiation necessary to stand out on shelves.

The global sports nutrition market is estimated at $14.6 billion and is expected to surpass $21 billion in value by 2022.1 With this growth, the category is experiencing a broadening consumer base that’s no longer dominated by bodybuilders and professional athletes but expanding into a wider group of individuals focused on fitness and healthy living.2 Globally, this expansion is largely being driven by growing numbers of proactive, health-conscious consumers turning to convenient lifestyle solutions—including sports nutrition foods, beverages and supplements—to meet their wellness needs.

Regionally, North America holds the largest market share, and lifestyle changes and rising concern for improving health and wellness are key drivers. However, one of the fastest growing markets for sports nutrition is the Asia Pacific region, set to reach $1.4 billion by 2022 (up from $816 million in 2017).3 This market is largely being driven by Japan and China, which represent over 90% of regional sales and together are projected to reach $800 million by 2022. Growth in Asia is attributed to an increase in disposable incomes coupled with rapidly changing approaches to health and wellness, fueling additional demand for sports nutrition products for both lifestyle and recreational uses.

The Challenges with Capturing Demand
While the market is ripe with opportunities worldwide, manufacturers struggle to create products that stand out in the marketplace. However, strategies that can help capture demand. Manufacturers should source functional ingredients that can deliver proven and targeted health benefits that align with the health and wellness needs of the expanding consumer base. Product offerings should also be formulated with safe, efficacious, and easy-to-formulate ingredients that fit regional consumer interests.

Targeted Products Yield Opportunity
Simply put, consumers want sports nutrition products that offer specific health benefits tailored to personal meal plans to fitness regimens based on metabolic makeup. Consumers are demanding products tailored specifically to their needs and lifestyles. In fact, a recent consumer survey found that products customized to their individual health needs are of interest to the expanding consumer base. Product offerings should also be formulated with safe, efficacious, and easy-to-formulate ingredients that fit regional consumer interests.

Research-Supported Ingredients are the Ultimate Differentiator
Consumer’s continue to expect specific information about health benefits in functional products. Only 15 percent of consumers believe traditional marketing and performance drinks deliver the product’s claims.4 Research-backed ingredients are the key to successfully differentiating products from the competition.

Wellmune® Research Supports Immune Health Benefits and Efficacy
Wellmune is a yeast beta glucan from a baker’s yeast. It is a successful second ingredient to be added to products to help support immune health.

Today’s consumers are seeking healthier ways to reduce fatigue, stress and cold/flu symptoms. This is one of the fastest growing wellness trends and increasingly important to consumers/headlines of the day.

This text continues on the next page...
In recent years there has been a considerable push to remove those ingredients which are perceived as being chemical or not natural with ingredients which are seen as being cleaner in declaration terms and potentially origin.
This drive has come from the retail sector and in particular the supermarkets who feel the consumer wants to see ingredients and names which they understand and can identify as being things they would have at home. This effect has now spread across all sectors of the food industry.

With sports nutrition moving from products only used by elite athletes into the mainstream, including now being found in the supermarket sector this has lead to a demand for cleaner products whilst maintaining product integrity.
Looking at the key trends and demands from the whole food sector including sports nutrition such as sugar reduction, salt reduction, fat reduction and clean alternatives we have looked to expand our Formulating The Future Together portfolio of formulations, and developed a few new ones to showcase the functionality of ingredients to meets these needs. For this we have utilised our Development Kitchen at Brenntag Widnes facility, working on trials as well as bespoke projects based on specific customer briefs.
As a food technologist, I find the opportunities for innovation truly fascinating, as so many truly innovative functional ingredients have been developed specifically to tackle the formulating challenges faced by the industry. It is exciting to be able to spend time with our technical team (Louisa, Taj, Steve and Patrick) on refining new recipes.

For more information please contact Stephen Herring, Brenntag UK & Ireland, on stephen.herring@brenntag.co.uk
Startup Innovation Challenge: Apply Now!

Now accepting submissions for the startup competition at Hi Europe & Ni 2018

Frankfurt/Amsterdam, 31 July 2018 – As part of Hi Europe & Ni 2018, trade show organizer UBM will showcase some of the most promising startups involved in the F&B industry. Applications for the Startup Innovation Challenge are now being accepted and the most promising concepts will be presented live to a professional audience on the first day of the event. The three winners will receive extensive coaching from recognized industry experts.

Startups often exemplify creative pioneers and outstanding innovations, but young companies sometimes lack the budget and support to make an impact on the market. This is why UBM launched the Startup Innovation Challenge in 2016. It gives founders or small new enterprises the opportunity to reach a broad specialist audience and receive valuable advice. The nominees will present their idea or innovation to a jury of experts on 26 November and at Hi Europe & Ni’s Industry Insights Theatre in Frankfurt.

With more than 10,000 visitors and more than 500 exhibitors, the show is the central trade event for healthy functional ingredients for the food and beverage industry. All shortlisted startups will have access to a Startup Lounge, situated in the heart of the exhibition, for the duration of Hi Europe & Ni 2018. This provides a perfect opportunity to meet, network and demonstrate their products to this highly relevant and influential group.

Interested startups must enter one of the following categories before Friday 21st September:

• Most Innovative Healthy Food or Beverage Ingredient
• Most Innovative Plant-Based Finished Product
• Most Innovative Technology or Service Supporting F&B.

The three winners will get individual advice from one of the jury members. In addition, the successful nominees can choose from various special prizes — from a fully equipped stand at Hi Europe 2018 or Fi Europe 2019 to a marketing campaign within the Ingredients Network or access to the “Conciergerie” innovation platform from Presans to intensive consultation at Wageningen University & Research.

Feedback from proven experts

The jury comprises industry experts, investors and company representatives from well-known corporations in the health ingredients industry. Jury member Thomas van den Boezem is Program Manager at StartLife, an incubator founded by Wageningen University & Research that specializes in coaching startups in the food industry. He says: “Novel food ingredients that make an environmental and health impact are a major focus for us. Wageningen University & Research performs extensive research on this topic; and, as a result, we see more and more startup activity in this space. But, we recognize that other ecosystems in the world often have creative new solutions that we’ve never seen before, so for us this challenge is a great way to stay engaged.”

Sandra Einerhand from Einerhand Science & Innovation, who helped to implement the first Challenge in 2016 and has been a jury panel member from the beginning, adds: “The world is in transition: the climate is changing, the population is growing and there is an increased risk of diet-related diseases. So, we have to do something to the way we produce and consume food. One source of innovation is start-up companies and the Challenge is a great way to support them. Receiving valuable feedback about their business model and product, and with valuable prizes on offer, they can both create awareness and use this opportunity to meet or identify potential investors or venture funds.”

To apply, companies should be less than 5 years old and have a solid business plan. The submission must focus on an exceptional new product or service that promotes health and, ideally, already exists as a prototype or service model.

Interested young companies can apply directly at https://startups.figlobal.com or contact sophie.clark@ubm.com for more information.
Don’t Let Aggressive Formulations Affect Your Tablet Production

By Alex Bunting – I Holland Marketing Manager

An overarching challenge when it comes to the manufacture of solid dose nutraceutical tablets is the nature of the ingredients found in natural supplements. They are often coarse, abrasive and sometimes corrosive in character. Multivitamins, for example, can contain over 80 active ingredients amounting to eight excipients including coating ingredients. When you compare this to a pharmaceutical formulation which on average contains one to four actives and five to six excipients, it is clear to see that nutraceutical formulations can create production problems due to its complex and aggressive nature.

With a high number of active ingredients, problems including particle size, flow, compressibility, moisture sensitivity, ingredient interaction, content uniformity and quality control (QC) testing can be difficult when producing tablets. There is also the universally problematic issue of sticking, one which can severely affect production. The difference is that pharmaceutical formulations are often synthetic and are formulated to aid compression, containing formulas that help bind the tablet and generally speaking have less impact physically on the tablet. Nutraceutical ingredients on the other hand, can be hard and difficult to compress. Due to the ‘difficult’ character of vitamins and minerals, tooling can be easily damaged through wear and impregnation.

The traditional solution to this issues is to order more tooling but if the specification is correct in the first place the rewards in increased yield, productivity and reduced equipment downtime can be huge.

Get the Design Right

So, let’s look in detail at the specific challenges facing nutraceutical manufacturers. First on the list is the tablet’s design.

To produce robust tablets, the design is an important consideration to start with as it is key to how producible a tablet will be and the overall quality of the final product. The design can help to reduce wear to tablet tooling, a vital factor when it comes to the abrasive formulations. If a tablet requires the profile to have a deep curve it can very often cause wear on the areas of tooling with the steepest gradient. During the compression stage, the granule must move sideways across this area to form the compact. This can grind on the punch tip face removing material over time, leading to problems like capping (when the top of tablet separates horizontally when ejected from the press) and delamination (when the tablet cannot be ejected from the press) and crowning of the punch tip. Having the correct tablet design can help with this issue, but there are also other elements to consider in the prevention of unnecessary tool wearing including material and coating.

Choose Your Material Wisely

The correct choice of tool steel can make a huge impact on production. The tool material must be balanced to give optimum tooling wear and durability. These properties include abrasion and corrosion resistance, compressive strength, hardness and resistance to chipping and cracking. Tool punches and dies are the main components to interface with the powders and granules, so they must be metallurgically robust, particularly in nutraceutical production as the wrong selection can accelerate wear. If the wrong choice of tooling steel is used, the compression of abrasive formulations will result in numerous problems in addition to those discussed above including embossing and breaklines being worn on the tooling resulting in lettering on tablets becoming poorly defined and functionality of breaklines compromised.

Some leading tooling manufacturers are investing in the development of punch and die packages designed specifically for the nutraceutical industry. One example is the new NutraTool® from I Holland which has been designed to combine the correct tool material and coating for the demanding compression of the tablets and generally speaking have less impact physically on the tooling. Nutraceutical ingredients on the other hand, can be hard and difficult to compress. Due to the ‘difficult’ character of vitamins and minerals, tooling can be easily damaged through wear and impregnation.

The choice of tool material is also the universally problematic issue of sticking, one which has been developed and manufactured to I Holland’s own bespoke specifications. ESA, or Electro slag re-melted steel, is refined to give lower non-metallic inclusions and a more consistent structure. This material has a higher chromium content as well as other compositional materials, providing greater wear resistance.

There are other suitable steels on the market including tungsten carbide which offers excellent wear resistance. This material is often used for the tooling to prevent wear and deformation of the die bores. It features a high compressive strength with an extremely high wear resistance lasting longer than conventional tool steels. I Holland’s experience has shown that this material is very brittle resulting in the premature fracture of punch tips so it is not suitable for nutraceutical tablet punches. This can be problematic. Certain formulations can also react with tungsten carbide and cause black spots on the walls of tablets.

With this in mind, looking at steel specifically designed for the nutraceutical industry like ESR NutraGrade steel used in NutraTool® would be beneficial.

Don’t Forget Your Coat!

When it comes to nutraceutical tablet coating, coating is necessary, giving it an extra layer of resistance to wear. The correct coating will improve the hardness of the tooling preventing abrasive, sharp-edged minerals affecting the tooling which can lead to weight variation, sticking and other issues resulting in the scrapping of the punch.

A resilient surface is the clearest between the punch tip outer diameter and the die bore. Course granule can penetrate this clearance accelerating wear. When the granule is compressed between the punch and die through lateral movement, it can wear the die bore and punch tip resulting in ringing, clawing and crowning of the punch tip. Having the correct tablet design can help with this issue, but there are also other elements to consider in the prevention of unnecessary tool wearing including material and coating.

Magnetron-sputtered PVD, used to apply NutraCote, helps to combat the ‘droplet’ effect. With magnetron sputtering the target material is vaporised by exciting the chromium atoms with a bombardment of gaseous particles. The magnetron sputtering process causes a very smooth (anti-stick) and dense coating to form. This process incurs none of the drawbacks associated with applying hard chrome. Additionally, this method is performed at a lower temperature than other PVD coatings and is therefore applicable to standard HPG-S steel as the lower temperature does not affect its structure.

The Proof is in the Numbers

During case studies, NutraCote has been shown that when paired with design improvements, and NutraTool® there are huge improvements in abrasive performance leading to much higher numbers of tablets being produced before the punch needs to be replaced.

Using a wear resistant coating is imperative when producing nutraceuticals. An example of this was seen during a trial undertaken by I Holland and a leading nutraceutical manufacturer. An uncoated tool steel and a traditional CrN coating were trialled against I Holland’s NutraCote (PharmaCote RS). After producing 10 batches of tablets (16,300,000) the uncoated steel and Chromium Nitride coated punches showed wear. The specially developed NutraCote was still intact with no wear after this production phase.

Following further production of 24 batches, the uncoated tool was removed due to excessive wear and the CrN coating had completely worn off the upper punch and was near to this status on the lower punch. Due to this result, the CrN was removed from the trial. NutraCote however was still intact. Although it was showing some wear around the punch edge, the coating was still protecting the embossing of the tablet.

The final results showed that the uncoated tooling lasted 14 batches, producing 22,650,000 tablets, with the traditional CrN withstanding 20 batches and producing over 32 million tablets. NutraCote lasted over 44 million tablets giving an increase of 93% in life over the uncoated steel used in the past.

Make the Right Choice

Ensuring that the correct choice of tooling is used within the production of nutraceuticals is crucial. The formulations used are habitually abrasive accelerating wear and leading to the premature damage of punches and dies. The results are decreased output and an increase in costs.

Look at the design of the tablet, make sure it is robust and includes the tailor-made properties required to produce a quality end product, then determine the most suitable material and coating combination for the product. Look for tooling which has been specifically designed for the manufacture of nutraceuticals as it will help to withstand the vigours of compressing difficult formula. By choosing the right quality punches and dies problems during manufacture can be prevented.

To find the best solutions to any tabletting issues consult with an experienced tooling manufacturer who has the knowledge and innovation to ensure a problem-free quality end product.
From epidemiological studies to a patented and awarded ingredient

... the story of Memophenol™ development

Inspired by epidemiological studies, Memophenol™ is an innovative formula combining French grape (Vitis vinifera L.) and wild blueberry (Vaccinium angustifolium A.) extracts, rich in selected bioavailable flavonoids. Backed by 1 patent, 10 publications and 2 awards, Memophenol™ is a natural and safe solution to support your cognitive performances.

Created in 2009, a SME called ACTIV’INSIDE discovered in several studies a neuroprotective and essential molecules acting against cognitive decline. This young company initiated and led a 4-year international R&D project to develop an innovative nutritional solution to decline: Memophenol™. The following article describes their innovative approach through this unique ingredient’s story.

Nutrition as a key factor to protect our memory

Whatever the age, some lifestyle choices increase the risk of cognitive decline, including smoking, unbalanced diet, lack of physical activity, and stress. Studies show that maintaining good general health habits help prevent cognitive decline. Diet affects our cognitive abilities in youth and impacts whether we develop memory troubles as we age.

Keeping the brain healthy through good nutrition is one important strategy in favor of reducing the risk of cognitive decline.

Recently, more than 6 epidemiological studies, carried out on 30,000 subjects revealed that individuals consuming a diet rich in essential polyphenols, like flavonoids found in berry fruits exhibit better cognitive function[1,2].

Figure 1: Flavonoid intake and cognitive functions, adapted from Lutenereu et al., 2007[3] However, 85% of US and 64% of Asian adults do not eat enough fruits and vegetables to meet dietary recommendations: their polyphenol intake, especially of specific flavonoids, is low. Efforts are essential to preserving optimal cognitive performances and preventing the age-related cognitive decline. In this context, supplementation is of primary interest.

To overcome the lack of science concerning this health topic, the research project Neurophenol™ thus aimed to answer to 3 main questions: Which polyphenols for brain among the 8000 existing in plants? Which mechanism of action? Are they of principal interest.

The following scientific studies were conducted according to a pharmaceutical approach:

- In the first part of the research project, a proprietary formulation of extracts from French grape and wild blueberry, named PEBG (Polyphenolic Extract from Grape and Blueberry) was developed.
  - Preclinical studies were performed in the second phase to evaluate the effectiveness of the PEBG specific ratio. Its synergistic and multiple effects of action on both bioavailability and neuroprotection were determined on different models. Several dosages were tested to confirm the ratio effectiveness and its safety.
  - Finally, a clinical study confirmed PEBG effectiveness on healthy humans. A bi-centric randomized, double-blind, placebo-controlled clinical study on 215 subjects has been performed. A formula adapted to humans was born: Memophenol™

Results of the research project

3.1 Which polyphenols for brain?

3 specific sub-classes of flavonoids were found to have the greatest potential to reach brain memory areas: anthocyanins, flavonols, especially monomeric especially monomers (catechin/epicatechin). Flavanol monomers have the highest bioavailability with an absorption rate of 45%, compared to that of dimers which not exceed 1%. Their positive action on brain is mainly due to their benefits on microcirculation[4-6] and oxidative stress in the hippocampus[7,8].

Resveratrol, owing to stilbenes sub-class, is able to cross the blood brain barrier and enhance hippocampal neurogenesis and synaptic plasticity[9,10].

Phenolic acids, especially ferulic acid, provide neuroprotective effects on the hippocampus by their antioxidant activity[11,12].

3.2 Where find these essential polyphenols?

Grape: the ‘brain berry’

Particularly rich in flavonols monomers and resveratrol, grape provided significant benefits on cognitive function, as reported in clinical studies[4,11,12].

Memophenol™ formula was developed with carefully selected Vitis vinifera L. varieties, having the best flavonol monomers content. Coming from Champagne and Bordeaux, Chardonnay and Pinot noir are two of the main grape varieties found in Memophenol™. They contain higher levels of monomeric flavonols when compared to others such as Merlot[13-15].

Blueberry: the ‘brain berry’

Also called “brain berry” for its clinically proven benefits[16]. On both short-term and long-term memories, blueberry contains specific flavonoids and phenolic acids known for their positive action on brain[17,18].

Wild blueberry (Vaccinium angustifolium A.) was selected for Memophenol™ development for its higher levels of phenolic compounds, especially ferulic acid. Its antioxidant activity is associated with higher concentrations of polyphenols, especially anthocyanins and phenolic acids, compared to cultivated blueberry[19].

3.3 A patented synergistic association of grape and blueberry

Memophenol™ justifies its innovative character by its unique ratio. Several doses of grape and blueberry were tested to optimize their synergistic effects on:

- Bioavailability: Co-ingestion of grape and blueberry extracts provides fivefold increase of plasma concentration of blueberry metabolites compared to single extracts administrations[20].

- Antioxidant activity: combined grape and blueberry extracts increase by 20% the neuroprotective effects on human neurons compared to single extracts.

Figure 2: Synergistic action of Memophenol™ patented ratio on bioavailability (left) and antioxidant activity (right)

This ratio is now internationally patented.

3.4 A clinically proven efficacy

Memophenol™ effectiveness was confirmed on humans by a bi-centric randomized, double-blind, placebo controlled clinical study[21,22]. 215 healthy seniors aged from 60 to 70 years old, having normal aged-cognitive decline were enrolled. Before (T0) and after 6 months (T6) of supplementation, 2 cognitive tests from the validated CANTAB battery assessed subjects’ memories: Verbal Recall Memory (VRM) test, evaluating short-term memory, and Paired-Associate Learning (PAL) test, assessing long-term episodic memory. This study shows that Memophenol™ improves short-term working memory and long-term episodic memory as it significantly increases the number of words recalled in the supplemented group, compared to placebo, in the total population (Verbal Free recall Recognition memory test, called VRM-FR).

Improves the episodic memory: Memophenol™ significantly reduces the number of errors at the PAL test on people having a more pronounced cognitive decline at baseline, also called “decliners”.

Induces a higher urinary concentration of specific flavonoids metabolites, traducing a Memophenol™ high bioavailability.

Complementary proprietary studies

Recently, Memophenol™ has been associated with:

- A recent pilot study conducted by ACTIV’INSIDE on 50 French graduated students, from 18 to 25 years old (mean age 23.1) coming from Bordeaux. The study shows that within 15 days only, Memophenol™ supplementation induces booster effects on 3 out of 5 students usually satisfied by their cognitive performances.

- A recent 12-year follow-up epidemiological study[23] conducted by Inserm, Activ’Inside and Harvard, was performed on 1329 healthy French people aged 65 years old and above to investigate how a diet rich in polyphenols could prevent cognitive decline. Results show that higher polyphenols consumption reduces the risk of having severe cognitive decline by 50% when comparing the population having the highest intake of polyphenols with the lowest one.

What makes Memophenol™ different?

Flavonoids are known for their antioxidant activity, as supported by 10 scientific publications conducted in a pharmaceutical R&D approach, either epidemiological, in-vitro, in-vivo and clinical studies, confirming its effectiveness on memory, with an identified mechanism of action on neurogenesis and synaptic plasticity.

Memophenol™ has been awarded twice internationally as:

- BEST INGREDIENT in the “Healthy Ageing” category at Nutraceuticals Awards 2017 (Vitafocus Europe 2017);

- BEST INNOVATION in the “Pharmaceutical Product” category at the 2016 French Innovation Corner (organized by SPlI France)

ACTIV’INSIDE will be exhibited at Vitafocus Asia 2018, September 11-12, Singapore. Come to see us booth N10 to know more about our product. On this event, we will present in exclusivity our last quick effect solution against stress, with Saf’Inside™ microtas, finalist of the Nutraceuticals Asia 2018 in the “Botanical product of the year” category.

References:

At Vitafoods Asia 2018, researchers and innovators will convene to discuss the current initiatives in the food industry that are designed to promote optimal population health.

Obesity rates among children in the Asia Pacific are growing at a rapid rate and will soon pose a serious healthcare threat to countries in the region if no action is taken, according to a recent warning by the United Nations’ Food and Agriculture Organisation (FAO).

Between 2000 and 2016, the number of overweight children under five years old in the region grew by 38 percent, and these children have a higher risk of becoming obese adults and then developing diseases such as Type 2 diabetes, high blood pressure and liver problems, the FAO said in April 2018.

To combat the threat of “diabesity” – a term used to describe the close relationship between Type 2 diabetes and obesity – governments and families need to encourage healthier diets, more active living and stress management exercises, says Dr Naaznin Husein, president of the Indian Dietetic Association’s (IDA) Mumbai chapter.

Dr Naaznin Husein, president of the Indian Dietetic Association’s (IDA) Mumbai chapter.

At this year’s Vitafoods Asia 2018 conference, which will take place on Sept 11 and 12 at Singapore’s Marina Bay Sands Expo and Convention Centre, Dr Husein will deliver a talk titled “Beyond Diabesity and Lifestyle: An Overview of 21st Century Chronic Disease Determinants”, which will outline her research in the field and offer practical tips on reducing diabesity.

The three keys to health
To eat their way to better health, people should avoid simple carbohydrates such as sugar and include more complex carbohydrates and protein in their diet, Dr Husein said in a recent interview.

“Protein is especially important for Asian populations because a large proportion of people have bodies that are low in muscle mass and high in body fat percentage,” she said. While such people’s weight may be normal for their height, they could have ‘normal weight obesity’, or ‘skinny fatness’ and be at a higher risk of developing metabolic diseases such as diabetes.

“Eggs, lean meats, pulses and nuts are all good sources of protein, and they also create more satiety and improve muscle build-up. Nuts are especially rich in micronutrients and helpful for weight management,” Dr Husein recommended.

“Encouraging an active lifestyle is also crucial. Simple measures such as taking the stairs or walking or bicycling to work make a big difference. Encouraging people to do more of their favourite sports is also effective because they are already engaged in the activities,” she said.

The third prong in fighting diabesity is finding ways to manage stress. When people are stressed, their bodies respond by releasing higher levels of a hormone called cortisol, which gives cells access to fat and glucose, so that they can escape from the danger.

Chronic stress leads to a sustained, higher level of blood sugar that increases the risk of diabetes. Furthermore, stressed people are more likely to eat unhealthily and exercise less. “Yoga, tai chi, meditation and other exercises that emphasise mindfulness definitely help in reducing stress levels,” Dr Husein said.

Making informed choices
To encourage more people to lead healthier lifestyles, the

Mumbai chapter of the IDA is embarking on a social media campaign that will explain food labels and emphasise the amount of exercise that people should do if they eat various popular dishes.

“It’s hard to tell people not to eat this or that because they will feel deprived. But if you tell them that they will need to walk for two hours to burn off the 550 calories that they gained from eating that slice of cheesecake, they may choose to walk or not eat that cheesecake. It will at least be an informed choice,” Dr Husein explained.

For more than a decade, she has worked with the non-profit Yoga Institute in India to study the effectiveness of lifestyle interventions by tracking, with their consent, the health of about 300 diabetic people who enrolled in its classes.

“We gave them advice about nutrition, exercises and mood management. Many of them who were on insulin are now off it and taking only oral hypoglycaemic drugs because they have achieved better diabetic control. They have done brilliantly, and that’s due to our holistic approach that looked at all of the factors in their lifestyle,” she said.

She summarised: “They also feel calmer and more in control of their lives. This goes to show that if you help people with their choices, and help them to decide what may be better or best for them, they can do very well.”

Attendees to Vitafoods Asia can stay abreast of the latest research into obesity and disease on life stages by attending the Life Stages Theatre, where researchers and functional food developers alike will present their research findings.

The Vitafoods Asia conference and exhibition provide visitors with a rich learning environment to discover all aspects of the development and application of nutraceuticals, through to the branding, packaging and marketing of finished products. At the conference, and at theatres inside the exhibition hall, subject matter experts and industry leaders will present, in-depth, the latest research into nutraceuticals and discuss recent trends or findings at panel discussions.

By Dr Naaznin Husein
Making Innovation Taste Good!

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PATENTS: US 9,579,352; US 9,717,766
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