

(Re)Formulating the Future of Health and Wellness

From low-in products to natural offerings to functional foods and beverages to cosmetic actives, the flavor and fragrance industry is poised to play a multi-faceted role in addressing consumer wellbeing.

“**[C]**ombining four key factors: health, convenience, fashionable packaging and affordable price is the winning strategy behind some of the most spectacular health and wellness developments,” notes a Euromonitor (www.euromonitor.com) report by Ewa Hudson, global head of health and wellness research.

Hudson adds, “Innovation and product reformulation are, in fact, the heart of health and wellness, with the challenge being to deliver healthier, and ideally naturally sourced, food and drink formats tasting just like the beloved fully sugarized and full fat non health and wellness ‘parents.’”

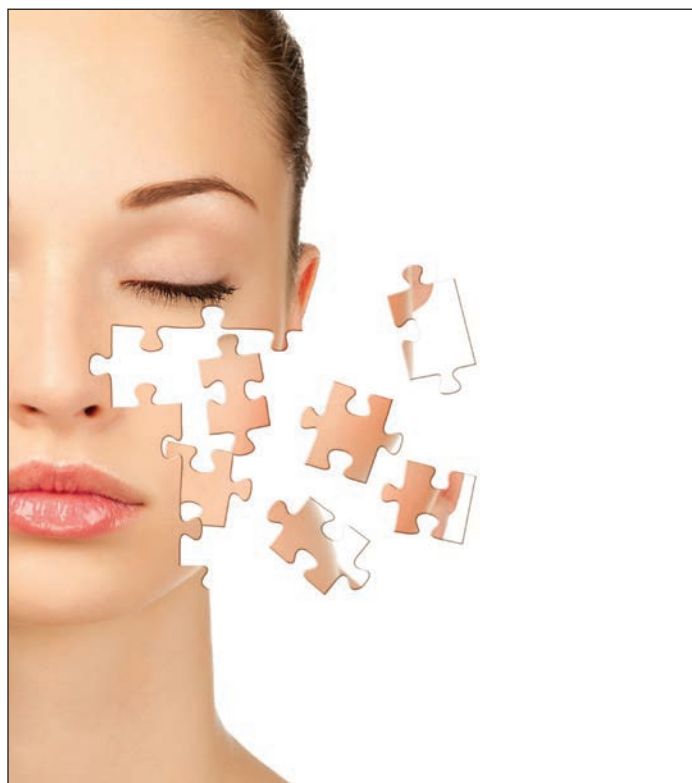
With predicted annual growth of 7.2% over the next three years, the health and wellness industry is poised to reach sales of \$1 trillion by 2017, according to Euromonitor (See “2012 Global Health & Wellness Sales” for a sales breakdown by category.) The category is being driven by strength in natural offerings and fortified and functional products, as well as by growth in markets such as China and Brazil.

Between 2012 and 2017, China and Brazil will have collectively contributed about \$103 billion in new sales to the global health and wellness market, according to Euromonitor. China has accounted for about one quarter of global growth in this category, boosted by increased incomes and living standards among consumers. Latin America, particularly Venezuela, Argentina and Brazil, are also posting significant double-digit sales gains.

The 2013 global market for functional foods and beverages totaled about \$176.7 billion in 2013, according to a report by Abunda Solutions (www.abundasolutions.com). Beverages grew at a rate of 10.8%, while foods rose at 6.9%, according to the firm.

Citing Euromonitor numbers, Abunda Solutions estimated that the fortified and functional segment of the health and wellness food and beverage market totaled \$246 billion, or about 1/3 of the total category. The growth in this segment has outpaced gains made by organic- and better-for-you-positioned foods, the report notes. In the United States, the Abunda Solutions report says, functional foods and beverages comprise about 5% of the total U.S. food market.

Meanwhile, the cosmetic actives market could grow to reach \$2.7 billion in 2018, according to numbers released by BCC Research (www.bccresearch.com), driven by a compound annual growth rate of 4.3%.



U.S. cosmetic and toiletry chemicals demand will grow at about 4.9% a year, totaling \$9.4 billion in 2016, according to numbers cited by Freedonia (www.freedoniagroup.com). “Botanical extracts will lead gains based on their favorable natural profile, which many consumers perceive as being more healthful and beneficial than synthetic chemicals,” the report notes.

Natural Positioning

Hudson noted that health and wellness-positioned products should be “ideally naturally sourced.” A recent Markets and Markets (www.marketsandmarkets.com) report notes that the natural flavor market will reach \$5.0 Billion by 2017. In the context of health and wellness, natural flavors enjoy a perception of safety, though cost constraints are always an issue for some formulations, the report explains.

“Natural food is considered safe, manufacturers are carrying out accreditation to mark the food as natural and safe, and it is one of the winning imperatives for the industry,” the report adds.

“The trend for natural products has proved to be the most important in recent years: starting with more natural reformulations of existing products and extending to consciously avoiding the use of artificial additives and preservatives in new products,” notes a recent announcement from Döhler ahead of the Free From Ingredients show in Brussels, where the company presented natural lactose-free and dairy-free alternatives such as soy and almond beverages.

Yet, the rising demand for natural flavors in particular has created supply challenges. For example, citrus has been impacted by the so-called greening disease, or huanglongbing, which harms the sensory profile of fruit and renders it unsuitable for processing. This complication comes in addition to inherent water and arable land shortages. As a result, flavor companies have invested in natural replacers. For example, Givaudan’s SUNthesis^a citrus ingredients present a one-to-one replacement for citrus, offering price stability and steady supply, while retaining a natural claim.

Meanwhile, to retain natural positioning for reduced sugar formulations, Firmenich launched SweetGem^b, which can reportedly reduce sugar by 20% to 40%. The product also maintains mouthfeel in-use, while improving the health profile and reducing overall cost of formulations. Döhler’s MultiSweet^c Stevia, on the other hand, is a naturally calorie-free sweetener, allowing for a 100% reduction in sugar without entirely sacrificing the formulations’ sensory properties.

Protein Boost

Protein is increasingly finding its way into beverages, meat-alternative products, energy bars, snacks and other products. According to Datamonitor’s (www.datamonitor.com) Product Launch Analytics database of new products, the percentage of new food and non-alcohol beverage products making a “high protein” claim is currently at its highest level in several years.

“Protein’s star is rising because the nutrient offers multi-dimensional benefits,” Datamonitor has reported. “Not only is protein seen as a muscle builder, but it is also perceived to be a great help in managing weight. Recent survey results bear out these perceptions: the International Food Information Council’s 2012 Food & Health Survey found that 69% of American consumers either ‘agree strongly’ or ‘agree somewhat’ that protein helps people feel full.”

Around the world, Datamonitor notes, protein intake is associated with athleticism and muscle-building. Meanwhile, vegetable proteins benefit from a perception of healthiness versus animal proteins, lower greenhouse gas emissions and sustainability.

The growing popularity of vegetable proteins and protein-enhanced product launches presents a huge opportunity for flavor houses, particularly as soy protein, in particular, has a generally recognized unpleasant flavor and mouthfeel. Using natural and vegetarian-friendly aromatic ingredients, flavor companies can improve consumer acceptance while maintaining natural positioning. To address soybean off notes, Givaudan, for example, has tackled the challenge using a combination of products derived from Maillard reactions, sweetness modifiers



What is lost when one suffers anosmia? Pleasure in food and drink and fragrances. Enjoyment of others. Loss of a connection to one’s environment. Anosmia can also impact mood and maintenance of proper diet.

off-note maskers, natural flavors and its Flavorburst^d technology, which encapsulates flavor-filled oil droplets and protects volatiles through heating associated with processing.

Protein technology can also be applied to reduce the total amount of meat used in meat-containing products. For instance, Mane’s meat-focused development center in Sablé-sur-Sarthe, France, has expanded into the area of vegetable fibers in meat applications. The products allow for the integration of vegetable fibers within meat applications with no impact on the taste, texture or appearance. The organization formulates blends for minced meat applications containing at least 51% meat (beef, pork or poultry) and different varieties of vegetable fibers and, depending on the product, vegetable proteins. The technical team addresses challenges such as meat-like textures and visual impression, juiciness and flavors

“For this type of solution, where fibers represent about 85% of the formula, the blending process itself is a real technical challenge,” said Raphaël Amanatian, technical leader of the project, upon its announcement. “According to the different lengths of the fibers which are used, the density and the fluidity of the powder blend varies.”

Depending on the formulation, the company has said that its Meat Pro blends can enable it to obtain the “high fiber” or “source of fiber” claim for the end product (regulation EC No 1924/2006).

Flavor Solutions with Modifying Properties

More than 70% of adults in the United States, Mexico, South Africa, Venezuela and many more countries are now considered overweight, according to the latest available World Health Organization data. Having progressed well beyond simply pursuing fat reduction, low-in products are targeting salt and, with implications on weight, sugar via natural and artificial non-caloric sweeteners, alone or in combination with taste modifiers

^aSUNthesis is a trade name of Givaudan.

^bSweetGem is a trade name of Firmenich.

^cMultiSweet is a trade name of Döhler.

^dFlavorburst is a trade name of Givaudan.

Recently, Firmenich, continued its taste innovation expansion in Asia, relocating Imad Farhat, vice president of breakthrough cost innovation for flavors from Princeton, New Jersey, to Shanghai. There, he works closely with the technical and commercial teams across Asia Pacific to service the “strong” demand for healthy ingredients in Southeast Asia, particularly in Indonesia, Thailand, Philippines and Malaysia, using technologies such as taste modulation. The company’s TasteGem^e range, which includes the previously mentioned SweetGem, allows for the replacement of sugar at a rate of between 50% and 100% (in combination with sucralose), improving the health profiles and reducing the costs of products while maintaining preferred flavors for consumers

Meanwhile, Senomyx Inc. and PepsiCo Inc. have extended their collaborative agreement related to Senomyx’s sweet-taste technology for an additional two years, through August 2016. PepsiCo will continue to have exclusive worldwide rights to the Senomyx sweet flavor ingredients developed under the collaboration for use in non-alcoholic beverage categories. Under the agreement, Senomyx will be entitled to committed research funding payments over the additional two-year period. Senomyx also will remain eligible for milestone payments based upon the achievement of predetermined goals, as well as royalty payments.

The companies have also signed an agreement related to Senomyx’s salt taste program, which aims to identify flavors with modifying properties intended to restore the desired salty taste in products with reduced salt (sodium chloride). Under the new agreement, PepsiCo will provide research funding for the salt taste program for 2014, and has options to extend the research funding period. PepsiCo will have non-exclusive rights to salt flavor modifiers discovered during the research funding period. In addition, Senomyx will have the right to supply these flavor ingredients directly to PepsiCo

Senomyx also recently gained E.U. approval for another sucrose modifier, S6973, which can now be marketed in the European Union, allowing commercialization in nearly every major country. S6973, also known as Sweetmyx^f SR69, is a flavor with modifying properties that is used as part of a flavor system to restore the original taste profile in products in which sugar has been reduced. It is applicable for almost all food categories, as well as selected beverages.

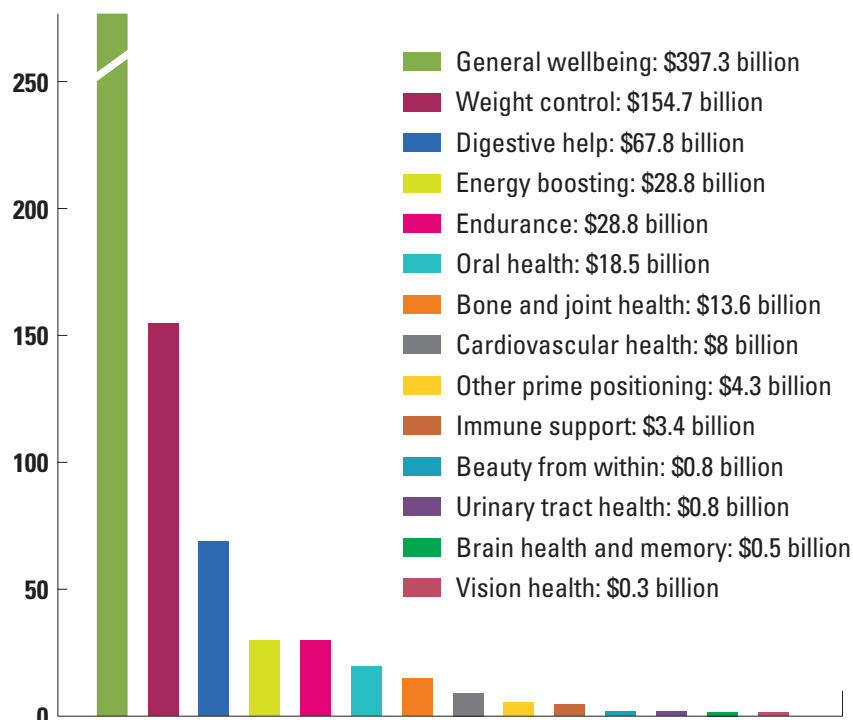
Probiotic Power

The probiotic ingredient market could be worth \$1,732.8 million by 2019, according to a Markets and Markets

^eTasteGem is a trade name of Firmenich.

^fSweetmyx is a trade name of Senomyx.

2012 Global Health & Wellness Sales*



*Source: Euromonitor; www.euromonitor.com

(www.marketsandmarkets.com) report. Asia Pacific comprises the largest market share, followed by Europe and North America. With the promise of “balancing the intestinal micro-biota, the report notes that consumers are attracted to the health and general wellbeing positioning of probiotic products, particularly as the baby boomer generation ages in the United States.

“Probiotic dairy products are expected to command the highest market share among all the probiotic foodstuffs,” the report notes. “Europe and Asia-Pacific are the dominating regions for these products. The North American consumers are gradually adopting these products and this market is estimated to grow at a healthier rate in coming years.”

In addition to beverages, yogurt products and supplements, brands are launching more niche products like probiotic baked goods, chocolates and ice creams.

Recently, Symrise increased its holdings in Swedish biotech probiotic producer Probi to 30.03%. Probi’s probiotic products are positioned as consumer healthcare and functional food, the latter of which are available as fruit and dairy products. The consumer healthcare products are sold as powders, tablets, sachets or capsules.

Confronting a World without Scent: Fighting Anosmia

“If you ask, you will discover a silent group of people who are unable to smell,” says Gary Beauchamp, director of the Monell Chemical Senses Center in Philadelphia. “It’s not [often] considered by others to be much of a problem, and currently not much that can be done about it.”

Beauty from within was valued at about \$0.8 billion, according to Euromonitor.

However, anosmia—the inability to perceive odor—can occur in numerous ways, including via congenital conditions, respiratory illnesses, head trauma and as a common part of the aging process. In the latter case, says Beauchamp, the loss can be so gradual that the sufferer is only somewhat aware of the loss of scent. Some losses are temporary, but many, or even most, are not. (Beauchamp acknowledges that anosmia-sufferer figures are difficult to come by, but that they likely number at least 6 million in the United States alone.)

What is lost? Pleasure in food and drink and fragrances. Enjoyment of others. Loss of a connection to one's environment. Anosmia can also impact mood and maintenance of proper diet.

To address this under-resourced disorder, which is given little priority in government funding, the Monell Center has announced A Sense of Hope: The Monell Anosmia Project (www.monell.org/research/anosmia), a three-year, \$1.5 million campaign in support of research and advocacy focused on anosmia.

“The research goal is to identify the biological causes of smell loss in order to develop potential treatment approaches for this under-recognized invisible disability,” Beauchamp says.

Potential routes to treatment, he says, could include regenerative olfactory stem cell research. Among aging consumers, anosmia can lead to depression. These sufferers may find themselves with reduced appetites due to a lack of pleasure in their eating. In other cases, anosmia sufferers may try to compensate for an olfaction deficit by boosting the taste-oriented inputs of salt and sugar in their food. Either way, deterioration of diet or unhealthy weight change can occur. Resolving the roots of anosmia and, perhaps, formulating sensory-boosted products specifically for these consumers, are the focus of industry and researchers.

“[S]mell can fast track to a person's past, and losing smells, which can be an early effect of diseases like Alzheimer's, can mean losing emotions associated with the smell, with lifetime memories ultimately vanishing forever,” notes a recent announcement by the U.K.'s The Perfume Shop and Alzheimer's Research U.K. (www.alzheimersresearchuk.org).

“It has been widely reported that loss of the sense of smell can be an early sign of degenerative diseases such as Alzheimer's,” says Jason Warren of the University College of London. “And while the study of smell processing in Alzheimer's is still in its infancy, there is some potential for smell to play a part in diagnosing and understanding the diseases that cause dementia.”

Warren's work includes pupillometry, which measures the physiological

brain response to stimuli, including odors, via pupil dilation measurements.

“We only have very preliminary results from this test, but together with mounting evidence in the field, we believe odors may be much better facilitators of memory and emotions than, for example, pictures and trigger quite different parts of the brain,” says Warren. “These are brain areas that cannot be probed in any other way, yet which are central to diseases like Alzheimer's. And, conversely, the loss of smell during diseases

like Alzheimer's amounts to a loss in the associated memories, experiences and emotions which those odors unlock."

Cosmetic Actives

U.S demand for cosmetic and toiletry chemicals will grow at about 4.9% a year, totaling \$9.4 billion in 2016, according to numbers cited by Freedonia (www.freedonia.com).

"Botanical extracts will lead gains based on their favorable natural profile which many consumers perceive as being more healthful and beneficial than synthetic chemicals," the report notes.

"Active ingredients are expected to total ... nearly \$2.7 [billion] in 2018, [at] a CAGR of 4.3%," notes BCC Research.

Echoing Freedonia's comments, Kline Group (www.klinegroup.com) has noted that botanical actives are highly sought-after, with an "estimated CAGR of 4% expected in the United States by 2015, and 5% in Europe during the same period."

Givaudan SA is currently negotiating with Agro Industrie Recherches et Développements (ARD) to acquire 100% of the shares of Soliance SA and its units, with the aim to build upon its existing active cosmetic ingredients business and enhance its current portfolio, including the fragrance division's work with natural molecules.

Soliance provides cosmetic solutions to its international clients and partners and develops active ingredients derived from vegetable sources, microorganisms and microalgae. Soliance currently has two sites in France, located in Pomacle and Ile Grande, and employs 77 people.

While terms of the deal have not been disclosed, the Soliance operations would have represented approximately CHF 25 million of incremental sales to Givaudan's results in 2013 on a proforma basis. The transaction is expected to close in the second quarter of 2014.

Givaudan's cosmetic active portfolio also includes BlurHD^g, which extracted from gardenia fruit. This material, a source of crocin, is an antioxidant with anti-ageing and anti-wrinkle activities derived from stimulation of ceramide synthesis. The company's hair strengthener and conditioner, Ceramide II, also acts as a skin moisturizer and lipid barrier builder. Meanwhile, its Soothex^h ingredient, derived from Indian frankincense, soothes sensitive skin, particularly in shaving preparations.

Meanwhile, the Robertet Group and Codif Recherche et Nature have purchased Hitex, which specializes in subcontracting active ingredient extraction by CO₂ supercritical processes for the perfume, cosmetics and aromatic industries. Robertet and Codif said they will continue to pursue this activity for third-party customers and develop new products for their own needs.

^gBlurHD is a trade name of Givaudan.

^hSoothex is a trade name of Givaudan.



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In cosmetics, Robertet has pinpointed the ability of certain aromatic components to inhibit the growth of microorganisms responsible for body odor. As a result, an active ingredient, called Deomixⁱ, has been launched; it can be combined with all styles of perfume.

Robertet's latest acquisition reflects its ongoing exploration of the use of naturals, particularly essential oils, absolutes and natural molecules, to impart odor and cosmetic properties, including anti-aging, moisturizing, soothing and slimming.

Robertet and Givaudan's activities are in line with those of their competitors. For instance, Symrise's SymHair^j Force 1631 combats hair loss by improving hair density. The product is microalgae-based. Its SymBronze^k 1659 is a natural tanner also derived from microalgae.

Takasago, meanwhile, offers a cypress odor compound, hinokitiol, which imparts antibacterial and antifungal activity to formulations at low concentrations. The material is useful as a preservative and antiseptic in hair care and oral care products. The company has also applied its aroma chemical synthesis expertise to the production of cost-effective ceramides for skin moisturization and tissue repair in cosmetics.

Frutarom, on the other hand, provides a range of materials, including the anti-acne ingredient, Z-Care^l, anti-ageing and sun care active TopicPure Green Mate^m and TopicPure Pink Rock Roseⁿ, which restore cell viability after sun exposure, while Sensient markets active ingredients for slimming, anti-free radical functionality, skin freshness and skin tightening.

ⁱDeomix is a trade name of Robertet.

^jSymHair is a trade name of Symrise.

^kSymBronze is a trade name of Symrise.

^lZ-Care is a trade name of Frutarom.

^mTopicPure is a trade name of Frutarom.

ⁿTopicPure is a trade name of Frutarom.

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