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Next Generation Joint and Mobility Actives /
Plant-Based Protein Alternatives /
The Gut-Skin Axis: Where Does Acne Begin /
Regulatory Update: Tea Tree Oil

Editor's Word

In this issue, you'll find coverage of next-generation joint and mobility ingredients, the accelerating shift toward plant-based proteins, and natural approaches to weight management. We also explore how gut health and the skin microbiome are reshaping acne care, along with advances in prebiotics and soluble fibers that support digestive and metabolic health.

On the beauty and personal care side, we examine the challenges facing small-scale cosmetic producers, emerging "inner beauty" concepts, and new ingredient launches that bridge nutrition and skincare. Scientific updates, including new findings on vitamin E compounds, highlight the growing role of evidence-based formulation in product development.

This issue also captures the global industry conversation through key events such as NutraFood Poland, Cosmoprof Worldwide Bologna, and Vitafoods Europe. Regulatory updates and sustainability insight - particularly in the seafood supplements sector - provide practical context for navigating compliance and responsible sourcing.

We hope these features spark ideas, inform smarter formulation choices, and help you stay ahead in a fast-evolving market.

Best regards,

Daria Šurić,
EDITOR-IN-CHIEF

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Next Generation Joint and Mobility Actives in Food Supplements

Next-generation joint and mobility actives in food supplements are reshaping musculoskeletal health by moving beyond traditional ingredients like glucosamine and chondroitin toward multi-targeted solutions including bioactive collagen peptides, advanced botanical extracts, and microbiome-modulating probiotics. Driven by the rapidly aging population projected, these nutraceuticals aim to support joint comfort, cartilage integrity, and long-term mobility through evidence-based, synergistic mechanisms.

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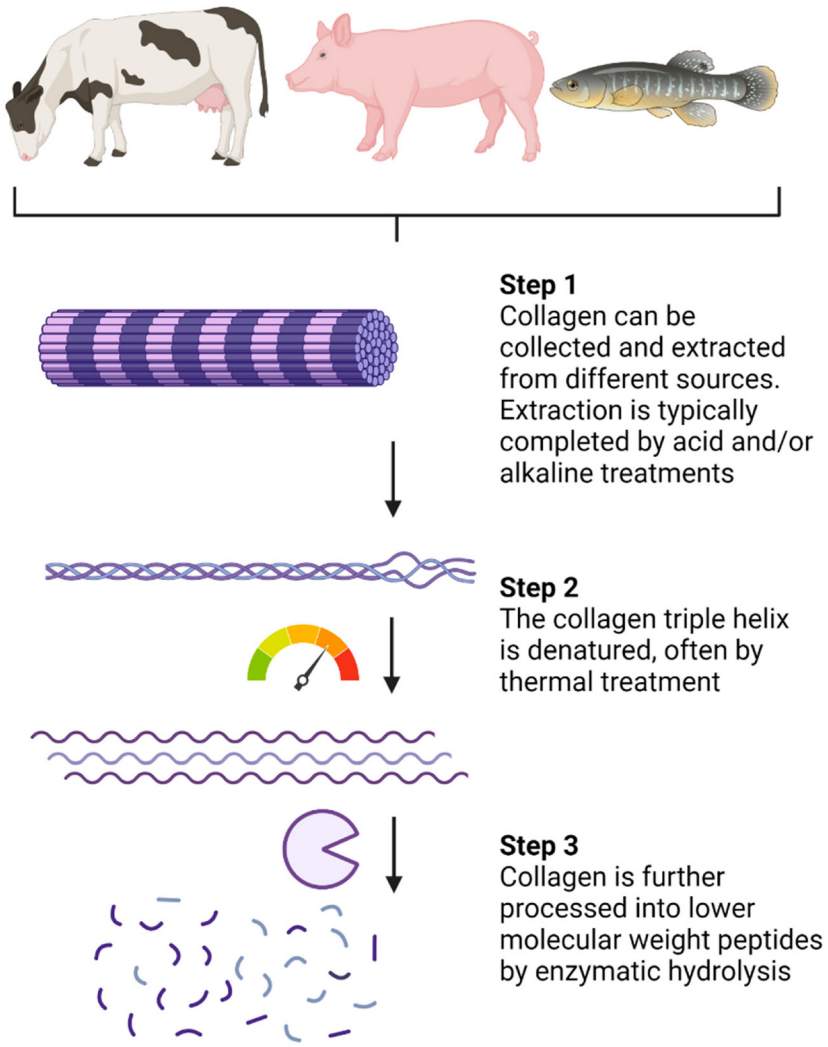
Maintaining joint health and mobility has become a central focus in the nutraceutical industry, driven by an aging global population and rising consumer demand for preventive healthcare strategies that support an active lifestyle. According to United Nations projections, the global population aged 65 years and older is expected to reach 1.5 billion by 2050, a significant increase from 703 million in 2019, highlighting the urgent need for effective interventions to address age-related musculoskeletal decline[1].

The evolution of joint and mobility actives

Historically, dietary supplementation for joint health has been dominated by well-established compounds such as glucosamine, chondroitin sulfate, and MSM (methylsulfonylmethane), which have long served as the standard of care for individuals seeking to alle-

Figure 1 Processing of native collagen into small low-molecular-weight peptides



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Taken from: *Larder, Christina E., et al. "Collagen Hydrolysates: A Source of Bioactive Peptides Derived from Food Sources for the Treatment of Osteoarthritis." Medicines, vol. 10, no. 9, 2023, p. 50, https://doi.org/10.3390/medicines10090050*

viate symptoms of osteoarthritis and general joint discomfort[2,3].

Traditional approaches to joint health

The foundational paradigm of joint supplementation has relied heavily on structural molecules intended to provide cartilage with the substrates needed for repair and maintenance, primarily through long-term administration of glycosaminoglycans and amino sugars. While these symptomatic, slow-acting drugs have shown potential for pain reduction and functional improvement in osteoarthritis patients, growing interest in nutraceutical supplements has broadened the scope to include a heterogeneous class of molecules that modulate inflammation, oxidative stress, and cartilage synthesis beyond simple substrate provision[2,4].

Emerging trends in supplement formulation

Contemporary formulation strategies are increasingly shifting toward multi-targeted approaches that integrate bioactive peptides, advanced botanical extracts, and microbiome-modulating ingredients to address the complex pathophysiology of osteoarthritis through anti-inflammatory, antioxidant, and tissue-protective mechanisms[2,5].

Next-generation actives: mechanisms and evidence

This section examines the scientific basis for innovative bioactive compounds that target specific pathophysiological pathways involved in joint degeneration, moving beyond substrate provision to modulate inflammatory mediators and cartilage metabolism. Among these advancements, hydrolyzed collagen and low-molecular-weight collagen peptides have garnered significant attention for their ability to deliver bioactive sequences that reach joint tissues and exert chondroprotective effects[6,7].

Novel peptides and proteins

Collagen hydrolysates (Figure 1), characterized by low-molecular-weight peptides typically 3-6 kDa, represent a significant advancement in protein-based ingredients because of their potential to accumulate in joint tissue and stimulate cartilage repair[8,9]. Clinical trials of these collagen derivatives have shown evidence of efficacy in reducing pain and improving joint function, although their ability to treat and reverse advanced joint degeneration remains to be fully established[2]. Beyond collagen derivatives, emerging research is investigating the role of bioactive peptides derived from other protein sources, such as casein and whey, which may exert anti-inflammatory effects by modulating pro-inflammatory cytokines and oxidative stress pathways[8,10]. These bioactive sequences have been shown to accumulate in articular cartilage and to stimulate extracellular matrix synthesis, providing a mechanistic rationale for their use in osteoarthritis management[11,12,13].

Advanced botanical extracts

Parallel to the development of novel protein-based ingredients, advanced botanical extracts are increasingly utilized for their potent anti-inflammatory and antioxidant properties, offering a complementary strategy to traditional substrate provision in osteoarthritis management[16]. Compounds such as hydroxytyrosol, a phenolic component found in olive leaf and oil, have demonstrated the capacity to inhibit prostaglandin E2 and nitric oxide production pathways, thereby attenuating the inflammatory cascade associated with joint degeneration[15]. Similarly, curcuminoids derived from turmeric and polyphenols from other plant sources have been investigated for their capacity to downregulate nuclear factor-kappa B signaling and reduce matrix metalloproteinase expression, thereby protecting cartilage from inflammatory degradation[16]. Studies indicate that supplementation with these polyphenol-rich botanical extracts can decrease serum levels of tumor necrosis factor-alpha and matrix metalloproteinase-3 in synovial fluid, while cellular models suggest they inhibit inflammatory pathways by reducing the production of inducible nitric oxide synthase and cyclooxygenase-2 enzymes[17]. This multi-pathway inhibition is further exemplified by ginger root extract, whose active constituent 6-gingerol exerts anti-inflammatory effects by reducing inducible nitric oxide synthase and TNF-α expression through the blocking of NF-κB and protein kinase C signaling in LPS-stimulated macrophages[18]. *Boswellia serrata* extracts, specifically those containing 5-Loxin and Aflapin®, further contribute to this anti-inflammatory landscape by reducing the enzymatic degradation of cartilage and modulating pro-inflammatory mediators[19]. Recent systematic reviews have highlighted that these phytochemicals, including curcumin and boswellic acid, may offer superior efficacy compared to traditional nutraceuticals such as glucosamine and chondroitin alone in managing osteoarthritis symptoms[20,21].

Microbiome-targeted interventions

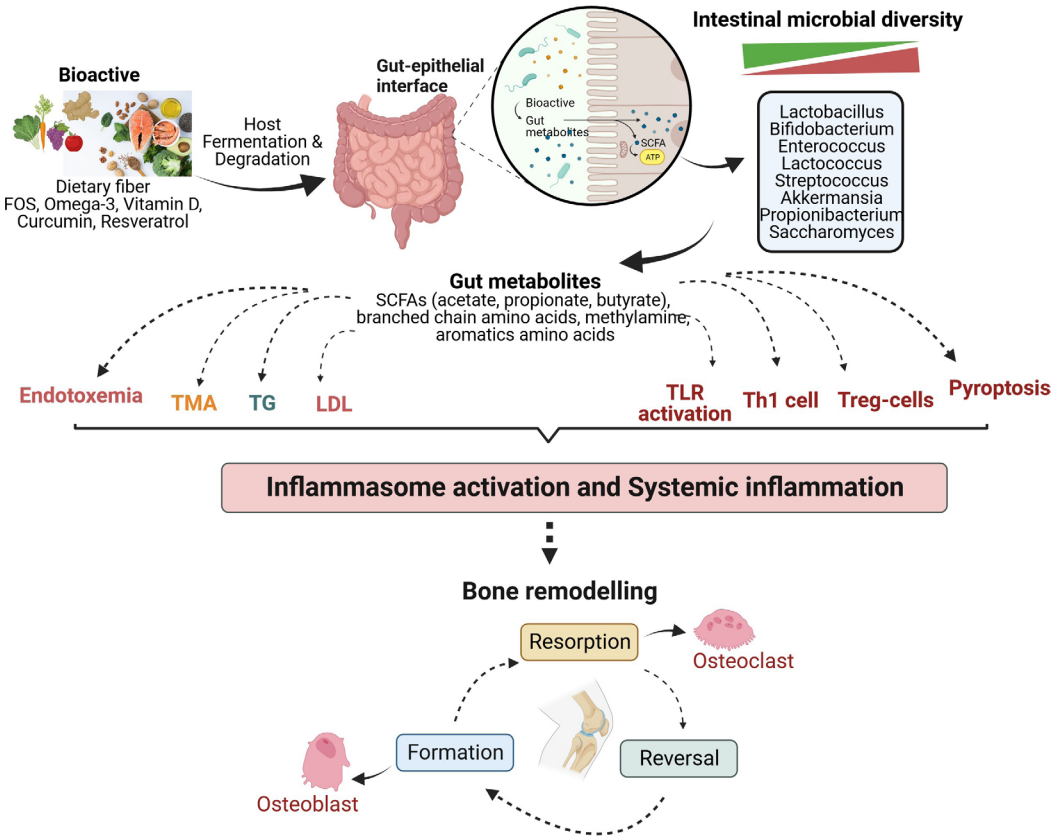
The gut-joint axis represents a promising frontier in next-generation supplementation, predicated on the understanding that intestinal dysbiosis and systemic inflammation contribute significantly to the osteoarthritis pathogenesis. Preclinical evidence suggests that modulating the gut microbiome through probiotic and prebiotic interventions can reduce systemic levels of inflammatory cytokines such as interleukin-1β and tumor necrosis factor-alpha, thereby potentially attenuating joint destruction[22,23]. Clinical studies support this mechanistic link, demonstrating that probiotic strains such as *Lactobacillus casei* Shirota can significantly lower C-reactive protein levels while improving pain and functional scores in patients with knee osteoarthritis[23] (Figure 2).

Building upon these individual probiotic effects, research indicates that combining probiotic complexes with bioactive compounds such as rosavin and zinc can upregulate tissue inhibitors of metalloproteinases while downregulating matrix metalloproteinases in human chondrocytes, thereby offering a multi-faceted approach to cartilage protection. Emerging evidence suggests that established nutraceuticals such as glucosamine sulfate and green-lipped mussel extract may also exert therapeutic benefits by regulating intestinal microbiota composition and immunity, with specific reductions in Clostridia species correlating with symptomatic improvement[24].

Synergistic ingredient combinations

The strategic combination of bioactive compounds has emerged as a critical approach to enhance therapeutic efficacy, as preclinical models and clinical trials suggest that mixtures such as curcumin and boswellic acids exhibit additive synergistic activity in the management of osteoarthritis pain[25,26]. This multi-targeted approach is further supported by evidence indicating that formulations combining undenatured type II collagen with hyaluronic acid and cat's claw extract can decrease pain and improve physical function with negligible adverse events, particularly when integrated with conventional symptomatic treatments and physical therapy[17]. Furthermore, recent preclinical data indicate that co-administration of specific probiotic strains with traditional substrates such as type II collagen and glucosamine can significantly inhibit pro-inflammatory cytokines, including TNF-α, IL-1β, and IL-6, while upregulating anti-inflammatory mediators such as IL-10 and TGF-β, resulting in reduced cartilage destruction compared to single-agent interventions[24]. This synergistic efficacy is further corroborated by clinical evidence demonstrating

Figure 2 Mechanism of bioactives actions in modulating the bone metabolism of osteoarthritis by gut-immune-bone axis



Various bioactive compounds undergo fermentation in the host gut by intestinal microbiota, thereby regulating microbial diversity and generating metabolites that majorly modulate the immune system, among other significant functions. They are involved in lipid metabolism, influencing the levels of triglycerides and low-density lipoprotein. Gut metabolites also lead to differentiation and activation of immune cells to strengthen the intestinal barrier and maintain gut homeostasis. These mechanisms act at the system level, reducing inflammation and affecting bone remodelling to balance osteoclastogenesis (bone resorption) and osteoblastogenesis (bone formation). FOS, Fructooligosaccharide; SCFAs, Short chain fatty acids; TMA, Trimethylamine; TG, Triglyceride; LDL, Low density lipoprotein; TLR, Toll-like receptor; Th1, Helper T lymphocytes type 1; Treg, Regulatory T lymphocytes.

Taken from *Basak, Sanjay, et al. "Bioactives and Their Roles in Bone Metabolism of Osteoarthritis: Evidence and Mechanisms on Gut-bone Axis." Frontiers in Immunology, vol. 14, 2024, p. 1323233, https://doi.org/10.3389/fimmu.2023.1323233*

that combining glucosamine with omega-3 fatty acids, chondroitin, or curcumin yields superior pain reduction and symptom management in knee osteoarthritis compared to monotherapies[27].

Formulation challenges and opportunities

Despite the promising therapeutic potential of these next-generation bioactive compounds, their successful translation into effective food supplements depends on overcoming significant formulation hurdles related to physicochemical stability and physiological delivery.

Bioavailability and absorption enhancement

The therapeutic efficacy of many next-generation actives, particularly polyphenols such as curcumin and lipophilic compounds, is often limited by their poor aqueous solubility and extensive first-pass metabolism, necessitating advanced delivery systems to achieve adequate tissue concentrations[28]. Novel delivery technologies, such as phytosome complexes, micelles, and nanoparticle emulsions, have been developed to overcome these limitations by enhancing solubility and protecting active ingredients from premature degradation in the gastrointestinal tract[29,30]. For instance, the incorporation of hydrolyzed collagen type II with low-molecular-weight hyaluronic acid and chondroitin sulfate creates a naturally occurring matrix that mimics human articular cartilage composition, thereby facilitating improved absorption and retention in synovial joints[31]. Formulation science must also address the pharmacokinetic parameters of absorption, distribution, metabolism, and excretion, as the manufacturing process and delivery vehicle can significantly alter the bioavailability and therapeutic efficacy of nutraceuticals[32].

Consumer acceptance and palatability

Beyond physiological efficacy, the commercial success of joint and mobility supplements is fundamentally dependent on organoleptic properties and patient compliance, as many bioactive ingredients, such as marine-derived compounds and concentrated botanical extracts, possess inherent bitter

tastes, unpleasant odors, or gritty textures that deter consistent consumption. To mitigate these sensory defects, manufacturers are increasingly employing advanced encapsulation technologies, such as lipid-based microencapsulation and spray-drying techniques, which effectively mask unpleasant flavors and odors while protecting the bioactive core from environmental degradation[33].

Market trends

The commercial viability of next-generation joint and mobility supplements is heavily influenced by the complex interplay between evolving regulatory standards and dynamic market forces across global jurisdictions. These frameworks vary significantly in their classification of bioactive ingredients, with some jurisdictions permitting structure-function claims based on traditional use while others require rigorous pharmaceutical-grade clinical trials to substantiate efficacy and safety[34]. Bioactive compounds are inherently susceptible to degradation from environmental factors such as heat, pH fluctuations, oxidation, light exposure, and hydrolysis, necessitating careful optimization of processing and storage methods to preserve molecular integrity in the final product[35]. Oxidation and hydrolytic degradation pose significant risks to the potency of sensitive ingredients like polyphenols and unsaturated fatty acids, requiring the use of stabilizing agents and protective packaging to maintain shelf-life[36,37]. Nanotechnology-driven approaches, including liposomes, microparticles, and nanoparticles, offer promising solutions by providing controlled release and enhanced protection against the harmful biological milieu that typically compromises bioavailability[38]. In vitro studies have demonstrated that, in osteoarthritis, the phospholipid layer, acting as a boundary lubricant, was absent from the articular surface of degenerated cartilage, highlighting the need for formulations that can restore this protective function[38].

Consumer demand and market growth projections

The global market for nutraceuticals and dietary supplements has experienced a remarkable surge in demand over the past decade, driven by a growing emphasis on preventive healthcare and heightened consumer preference for bioactive products. Market analyses project substantial growth in the joint health sector, with the collagen market alone estimated to reach $6.63 billion by 2025 and U.S. consumers expected to spend approximately $122 million on collagen products, a significant portion of which will be allocated to collagen-based nutraceuticals for bones and joints[32]. Ethical considerations in product development require rigorous quality assurance and transparency to address consumer skepticism regarding safety, efficacy, and the accurate labeling of bioactive ingredients. The absence of unified international standards for nanomaterials and novel delivery systems creates significant barriers to commercialization, as regulatory bodies such as the European Food Safety Authority and the U.S. Food and Drug Administration increasingly mandate comprehensive toxicological testing and transparent labelling practices to ensure consumer safety[39].

Conclusion

The advancement of joint and mobility actives in food supplements marks a paradigm shift from traditional symptomatic relief toward multifunctional, evidence-based interventions that target the underlying pathophysiology of musculoskeletal degeneration. By integrating novel bioactive compounds, such as advanced peptides, targeted botanical extracts, and microbiome-modulating agents, with sophisticated delivery technologies, next-generation formulations have the potential not only to alleviate pain but also to modify disease progression and restore functional capacity[38,40]. However, the successful translation of these scientific advancements into mainstream clinical practice depends on addressing persistent methodological limitations in current research and establishing robust, standardized clinical evidence that can withstand regulatory scrutiny[32,41]. Future research directions must prioritize large-scale, randomized controlled trials that use validated biomarkers and standardized outcome measures to definitively establish the therapeutic efficacy and safety profiles of these emerging ingredients[32,42].

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Shifting the Protein Paradigm: Health, Sustainability, and the Rise of Plant-Based Alternatives

Plant-based protein is emerging as a sustainable, high-quality alternative to animal protein, supporting muscle health, weight management, and overall nutrition while significantly reducing environmental impact and greenhouse gas emissions. As demand for sustainable diets grows, plant protein sources such as legumes, soy, and microalgae are reshaping the future of healthy, eco-friendly nutrition.

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Proteins constitute one of the three primary macronutrient classes, together with carbohydrates and lipids, and as such serve as a significant source of dietary energy. Beyond their energetic contribution, proteins are crucial for normal growth and maintenance of the organism, immune health, cell structure (keratin, collagen, elastin), communication between cells and tissues through peptide hormones, catalysing biochemical reactions as enzymes, and the overall maintenance of physiological homeostasis.

Furthermore, protein intake has been associated with increased concentrations of high-density lipoprotein (HDL) cholesterol, improved bone health and mineralization, and enhanced thermogenesis and satiety, thereby contributing to weight management. The Recommended Dietary Allowance (RDA) for protein consumption is 0.8 g/kg of body weight/day for a healthy adult. Nevertheless, some specific groups require higher intake, including older adults, pregnant and lactating women, athletes, and individuals with elevated physical activity levels.

Evidence suggests that protein consumption at or above current recommendations may have additional health benefits, including increased leg power and gait speed, increased lean body mass, and improved bone density. Given these physiological advantages, the growing popularity of high-protein

TABLE 1 DIAAS values of certain protein-rich food sources.

PROTEIN SOURCE	DIAAS VALUE
corn	36
rice	47
wheat	48
oat	57
pea	70
soy	91
potato	100
whey	85
eggs	101
pork	117
casein (milk)	117

products doesn't surprise, but their source and overall quality should be considered. According to the USDA Dietary Guidelines (2020–2025), even though approximately three quarters of Americans meet or exceed the recommendation for meat, poultry, and egg intake, nearly 90 % fail to meet the recommendations for seafood intake, and more than half of the American population consumes insufficient amounts of nuts, seeds, and soy products. These guidelines therefore emphasize the need to replace animal products, especially processed or high-fat meats, with seafood or beans, peas, and lentils, which could also help reduce saturated fat and sodium intake while increasing dietary fibre consumption.

Plant proteins, or plant-based proteins, are protein fractions derived from a variety of plant sources. These primarily include pulses or legumes (peas, beans, lentils, chickpeas, and faba beans), cereals (rice, wheat, corn, millet, and barley), pseudocereals (quinoa, amaranth, and buckwheat), seeds (flaxseeds, pumpkin seeds, chia, and sunflower seeds), nuts (almonds, hazelnuts, and peanuts), and algae (e.g. microalgae).

Growing consumer preference for plant-based proteins is driven by multiple factors, including concerns regarding sustainability, nutrition and health, animal welfare, ethics, and environmental impact. Plant protein production is expected to result in much lower greenhouse gas emissions, reduced pollution, land or water use, and less biodiversity loss. Economic factors are also of great importance, with plant-derived proteins representing an inexpensive alternative to animal-based proteins. In addition, climate change and biodiversity loss are limiting supply stability and raising the costs of animal-protein production. For example, producing 1 kg of plant-based burger has been estimated to generate approximately 90% fewer greenhouse gas emissions and to require 93% less land area, 99% less water, and 46% less energy than producing an equivalent quantity of beef burgers. Moreover, reallocating land currently dedicated to livestock production toward plant protein cultivation could theoretically yield up to ten times greater protein output, with the potential to feed 10-20 times more people.

Plant proteins are traditionally classified as follows: albumins (soluble in water but susceptible to heat coagulation), globulins (soluble in dilute salt solution), prolamins (soluble in 70-80% ethanol solution, heat resistant), and glutelins (soluble in dilute alkaline solutions). Globulins represent the predominant storage proteins in legumes and seeds, accounting for 60–80% of total protein content, followed by albumins, which account for approximately 10–25%.

Dietary protein quality is determined by its content and bioavailability of indispensable (essential) amino acids, which cannot be synthesized by the human body and therefore must be supplied through the diet. In 1989, a joint FAO/WHO Expert Consultation proposed protein quality assessment by comparing the concentration of the first limiting indispensable amino acid in a test protein with that of a reference amino acid pattern, and correcting this ratio for true faecal protein digestibility as determined in a rat model.

This approach led to the adoption of the Protein Digestibility Corrected Amino Acid Score (PDCAAS), which, for more than three decades, served as the standard method for evaluating protein quality in human nutrition. However, several methodological limitations of PDCAAS have been identified, including reliance on total tract crude protein digestibility rather than individual amino acid digestibility, the assumption that all amino acids are equally digestible, and extrapolation of results from the rat model to human physiology.

In response to these concerns, the Food and Agriculture Organization recommended in 2013 adopting the Digestible Indispensable Amino Acid Score (DIAAS) as a more precise alternative. Unlike PDCAAS, DIAAS is based on the true ileal digestibility of each individual indispensable amino acid, thereby providing a more accurate assessment of amino acid bioavailability. DIAAS values of certain protein-dense foods are given in Table 1.

Legumes generally contain between 20 and 35% protein on a dry weight basis, although this amount varies depending on species, environmental conditions, and stage of maturity. Compared to cereal grains, legume proteins are generally richer in lysine and threonine, but are often limited in sulphur-containing amino acids such as methionine and cysteine, and, in some cases, tryptophan.

As already mentioned, for a protein to be considered of high quality for human nutrition, it must provide sufficient quantities of all essential amino acids and be efficiently digested and absorbed. Although many plant proteins contain appreciable levels of essential amino acids, their nutritional value may be constrained by lower digestibility and the presence of antinutritional factors, including dietary fibre and trypsin inhibitors.

Traditionally, soy has been regarded as the primary plant-based complete protein, although advances in processing technologies have highlighted pea

protein as another plant source containing all nine essential amino acids. Although animal proteins have often been considered superior for supporting muscle protein synthesis and athletic performance due to their amino acid profile and bioavailability, current evidence indicates that well-planned plant-based diets can adequately support muscle maintenance and development when sufficient amounts and complementary protein combinations are consumed.

Combining different plant sources, such as cereals, typically limited in lysine but adequate in sulphur-containing amino acids, and pulses, lysine-rich but methionine-limited, is a great approach for achieving a complementary amino acid profile and improving overall protein quality. Rice and beans, oatmeal with nuts or seeds, and wheat bread with peanut butter are simple dietary examples of ways to enhance both the nutritional value and the amino acid complementarity of plant-based meals.

An additional benefit of plant-based dietary patterns, beyond their contribution to overall protein intake, is their simultaneous provision of complex carbohydrates, including soluble and insoluble dietary fibre, as well as slow-digesting starches and oligosaccharides, particularly in pulses. In addition to their favourable carbohydrate profile, legumes are characterized by their high protein density relative to energy content, while contributing minimal fat compared with many animal-derived protein sources.

Compared with cereal grains, which generally provide lower protein proportions, legumes represent one of the most concentrated plant-based protein sources. Moreover, legumes provide a broad spectrum of micronutrients, including potassium, magnesium, folate, selenium, and phosphorus, and contain bioactive compounds associated with favourable lipid profiles and potential protective effects against certain malignancies. Dietary patterns emphasizing plant-based protein sources have been linked to improved cardiometabolic health outcomes, including reduced risk of cardiovascular disease, obesity, type 2 diabetes, and metabolic syndrome. These benefits are attributed not only to fibre-mediated effects on gastrointestinal health, satiety, and glycaemic regulation, but also to the specific amino acid composition, which may enhance insulin sensitivity, modulate glucagon secretion, and promote lipolysis and gluconeogenesis.

Importantly, when total protein intake meets physiological requirements and a variety of plant protein sources are consumed to ensure adequate intake of indispensable amino acids, plant-based dietary patterns can support muscle mass maintenance and strength development to a degree comparable to omnivorous diets.

Although greater consumption of plant proteins offers recognized health and sustainability advantages, it may also be associated with higher intake of antinutritional compounds, such as tannins, trypsin inhibitors, and phytates, which can impair their digestibility and amino acid availability. Tannins and other polyphenols can form complexes with proteins and chelate minerals, including iron, zinc, and calcium, thereby reducing nutrient bioavailability.

In parallel, protease inhibitors interfere with the activity of digestive enzymes, limiting efficient protein hydrolysis. However, evidence indicates that conventional processing and preparation methods markedly attenuate these effects. Thermal treatment is particularly effective in deactivating protease inhibitors (cooking has been shown to reduce trypsin inhibitor activity in pulses by nearly 90%), thereby markedly improving protein accessibility. Similarly, soaking and germination decrease tannin and polyphenol concentrations, while fermentation facilitates phytate degradation through the action of endogenous and microbial enzymes. Mechanical processing strategies, such as milling into flour or producing protein concentrates and isolates, further enhance digestibility by disrupting cell wall structures that physically entrap proteins. Although protein isolation techniques can improve nutritional quality, they may involve higher environmental costs, particularly when water-intensive extraction methods are employed. In addition to nutritional considerations, sensory characteristics represent a further challenge for plant protein applications.

Compared with dairy proteins, plant-derived proteins frequently exhibit more pronounced off-flavours. Soy proteins are commonly described as having “green,” “beany,” or “grassy” notes, whereas pea proteins may express “beany,” “green pea,” “grassy,” “cardboard-like,” sulphurous, or other undesirable flavour attributes. These sensory properties can limit consumer acceptance and often necessitate additional processing, flavour masking, or formulation strategies. Furthermore, certain protein-rich plant sources, including soybean, peanut, and wheat,

are recognized allergens, with emerging evidence suggesting a rising prevalence of hypersensitivity reactions to other legumes, such as peas and lentils.

Besides legumes and grains, microalgae have emerged as a novel and promising source of dietary protein. Species such as *Arthrospira, Chlorella, Aphanizomenon*, and *Nostoc*, have attracted increasing attention as sustainable alternative protein sources for food and feed applications. While macroalgae typically contain 9-47% protein on a dry weight basis, microalgae may reach protein concentrations of up to 70%, positioning them among the most protein-dense biological materials available. In addition to protein content, algae represent a rich source of vitamins, minerals, dietary fibre–like polysaccharides, and a diverse array of bioactive peptides associated with antioxidant, antihypertensive, immunomodulatory, and other health-promoting properties.

Algal proteins generally supply all indispensable amino acids and are therefore similar to soybean proteins and considered complete proteins. Among microalgae, *Arthrospira platensis* (commonly referred to as spirulina) is particularly notable for its 55–70% protein content, favourable amino acid profile, and functional properties, including emulsifying and stabilizing capacities suitable for incorporation into formulated foods. This considerable protein content supports its application in functional food development. From a regulatory perspective, where certain species, such as *Arthrospira* and *Chlorella*, have achieved Generally Recognized as Safe (GRAS) status in the United States, other microalgal products are still subject to premarket evaluation in both the U.S. and the European Union. Despite their nutritional promise, safety concerns remain, as marine-derived algae may accumulate iodine, heavy metals, and other environmental contaminants.

Sensory characteristics also present formulation challenges, since many algal proteins exhibit intense green pigmentation, marine or fish-like aromas, umami notes, and, in some species, bitterness. Spirulina, often described as a "superfood," is characterised by dark, black colour and intense, earthy aroma, which may limit its inclusion in certain products. Nevertheless, strategic processing and product development approaches continue to expand the feasibility of algae-derived proteins as functional, nutrient-dense ingredients aligned with health and sustainability objectives. Incorporation of spirulina into the diet has been associated with potential health benefits, such as boosting the immune system, stimulating anti-inflammatory effects, and improving muscle strength and endurance.

In conclusion, proteins are essential for growth, structural integrity, metabolic regulation, and the maintenance of overall physiological homeostasis. Although total protein intake is generally sufficient in many populations, the distribution of protein sources in the diet is often not optimally balanced. Increasing the variety of protein sources, particularly by incorporating more nutrient-dense plant-based options, can help improve overall diet quality. When consumed in adequate amounts and thoughtfully combined to ensure a complementary, indispensable amino acid profile, plant proteins can effectively support muscle maintenance, bone health, and cardiometabolic function.

Beyond their protein content, plant-based diets offer additional benefits through their high content of dietary fibre, micronutrients, and bioactive compounds, while having significantly lower environmental impact than animal-based protein production systems. Novel protein sources, such as microalgae, further broaden the spectrum of high-quality, sustainable protein ingredients, though safety, taste, and regulatory considerations require careful consideration. Overall, current scientific evidence supports a gradual shift from animal-protein based diets towards a more diverse and balanced intake of plant protein sources, promoting both individual health and long-term environmental sustainability.

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Cirpusins™

The Natural and Safe Pathway to Weight Loss

Cirpusins is a potent herbal formulation for weight management

An Overview Of Obesity and Overweight Rates

Obesity is now recognized as a global epidemic, and a quick look at the rates of overweight and obesity makes it very clear. Indeed, the worldwide prevalence of obesity nearly tripled between 1975 and 2016, and it is estimated that by 2030 over 1 billion people globally will be living with obesity (1). Being overweight poses intrinsic, serious risks and health impairments (2), driving many to fight for a healthy weight or to avoid putting on fat.

Consequently, consumers are turning to products to assist them in their weight management journey (3).

These products can prove to be very powerful allies, actively enabling weight loss while making diet and lifestyle changes easier to adopt. But then, while conceiving such products, two criteria should be absolutely paramount: their potency, and maybe even more importantly, their safety and ability to improve overall health without any compromises.

From Ancient Wisdom to Reliable Science

This is what sets Cirpusins® apart. Because it consists of a standardized extract of the roots *Cyperus rotundus* rhizomes, it actually utilizes a knowledge known for millennia, whose safety and potency have been observed and tested across ages and civilizations all over the world. It was employed, for example, in traditional Chinese medicine as well as in the Indian ayurvedic system, but also by the ancient Greek and Arabs of the Levant, as far back as 100 CE.

Drawing from these insights, the main components responsible for the powerful health benefits of this plant have been identified. This is how thousands of years of literature and consumption of *Cyperus rotundus* have been condensed in one very potent and safe product for weight management: Cirpusins®, which encompasses the benefits of the three pharmacologically active molecules and is scientifically evaluated for its anti-obesity potentials in vitro and in vivo (4).

As an herbal extract, Cirpusins® is not only rooted in nature but also supported by multiple clinical and safety studies. This enables Cirpusins® to benefit from a strong documentation for its antiadipogenic potential, helping product formulators to appeal to consumers looking for proven, safe natural products.

Proven Benefits for Breaking Down Fat and Biochemistry Regulation

Cirpusins® is a standardized extract containing 6-8 % stilbenes, in the form of Scirpusin A, Scirpusin B and Piceatannol (5). These molecules originally have antimicrobial properties for the plant, protecting it from fungal infection and toxins. However, they have much broader biological applications, and naturally occurring stilbenes such as those concentrated in Cirpusins® delivers multi-functional effects. This enables Cirpusins® to not only target one specific aspect of weight gain and adipocytic biochemistry but to encompass multiple processes, allowing for a more holistic, complete and fruitful approach:

1. Boosting adipocyte browning. Contrary to white adipose tissues which are responsible for energy storage, brown adipose tissues are more prone to lipolysis (breaking down) and therefore contribute to fat loss (6).
2. Lipid profile normalization. Under a high-fat diet, Cirpusins® has been proven to bring the levels of total cholesterol, lipoproteins, and triglycerides back to values very close to those of a normal diet.
3. Biochemistry normalization. Similarly, Cirpusins® normalizes liver enzymes, blood glucose levels and uric acid levels without any adverse effects.

Overall, taking two 525 mg capsules per day of Cirpusins® shows in clinical studies a significant decrease in body weight, BMI, waist circumference and lipid profiles, with no serious adverse effects or safety concerns.

Rewiring Fat Gain: The Preventive Game Changer

Furthermore, this multifunctional effect serves another purpose: going beyond weight loss and making putting on fat more difficult. This is why Cirpusins® also appeals not only to overweight and obese people, but also to sportspeople as well as individuals conscious of their weight looking for weight management products. Because of it has been shown to inhibit adipogenesis in vitro, it has a preventive and protective effect, making achieving long-term weight goals more doable.

Boost Fat Tissue Breakdown and Restore a Balanced Biochemistry

Cirpusins® sets itself apart by leveraging multiple mechanisms crucial for effective weight managment.

Studies demonstrate substantial breakdown of fat with no adverse effects, even at high doses. Furthermore, subjects suffering from obesity showed improved lipid profiles and blood chemistry normalisation. Because of this, Cirpusins® presents impressive potential for weight management applications.

With Cirpusins®, answer consumer demand for proven, natural and safe products tackling obesity, boosting fat burning for athletes, or helping the weight-conscious to stay trim.

Rewiring Fat Tissue Genesis: Disrupt Obesity at the Root

Cirpusins® acts on weight management far beyond fat burning. Studies have shown it to inhibit adipogenesis, thus preventing the formation of fat cells in the body.

This preventive effect, combined with Cirpusins® other key benefits, opens up a whole new approach to weight management applications.

With Cirpusins®, answer consumer demand for proven, natural and safe products tackling obesity, boosting fat burning for athletes, or helping the weight-conscious to stay trim.

Natural, Time-Tested, Proven by Science

As a standardized extract of the *Cyperus rotundus* rhizomes, Cirpusins® leans on nature to enhance the body's fat burning mechanisms. Its potency has been observed throughout time and across the world.

Recent studies carried out by Sabinsa have proven the safety of Cirpusins® while highlighting its ability to induce a significant decrease in body weight, BMI, waist circumference and lipid profiles. This opens up a host of opportunities in weight management applications.

With Cirpusins®, answer consumer demand for proven, natural and safe products tackling obesity, boosting fat burning for athletes, or helping the weight-conscious to stay trim.

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You can learn more about Cirpusins® by visiting its website: https://cirpusins.com/. You can also download the white paper "Cirpusins – A Potent Herbal Formulation for Weight Management" here: https://cirpusins.com/newsroom/whitepaper/cirpusins-a-potent-herbal-formulation-for-weight-management/.

About Sabinsa

Sabinsa Corporation, founded in 1988 by Dr. Muhammed Majeed, is a manufacturer and supplier of herbal extracts, cosmeceuticals, minerals and specialty fine chemicals. Sabinsa's mission is to provide evidence-based natural products for human functional nutrition and well-being.

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NutraFood Poland 2026 – the Supplements and Functional Food Industry Meeting Returns to Warsaw this April

On 14-16 April 2026, the next edition of the International Exhibition for Dietary Supplements and Functional Food, NutraFood Poland, will take place at EXPO XXI Warsaw. The event will once again bring together manufacturers, distributors, raw material suppliers, technology companies, and experts connected with the nutraceuticals and functional food market.

NutraFood Poland

NutraFood Poland Exhibition together with WorldFood Poland

As in previous years, the NutraFood Poland exhibition will be held in parallel with the WorldFood Poland food industry fair, creating the largest business platform in Poland for the food and health-oriented sectors. The synergy of both events ensures broad reach, high attendance, and the presence of several hundred exhibitors and thousands of professional visitors from Poland and abroad, including representatives of trade, industry, and retail chains.

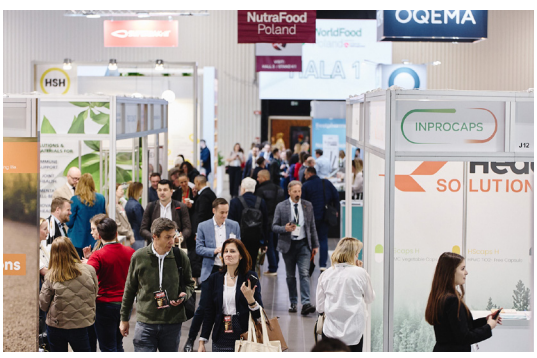
That's why it's worth not wasting any more time and planning your company's stand reservation now!

The only exhibition of its kind in Poland

NutraFood Poland is the only B2B exhibition in Poland entirely dedicated to dietary supplements, nutraceuticals, and functional food. The thematic scope of the event includes:

- dietary supplements and pet supplements,
- food ingredients and additives,
- functional food and beverages,
- services and technologies for the dietary supplement and food industry,
- private label and contract manufacturing.

The comprehensive formula of the fair makes NutraFood Poland a real platform for showcasing new solutions and developing business cooperation.



Why become an exhibitor?

Participating in NutraFood Poland 2026 is an excellent opportunity for both manufacturers and distributors to gain new business partners, present their offer to a wide group of decision-makers, and stay up to date with current trends and regulatory challenges.

An extensive educational program will be an integral part of the event, featuring presentations, panel discussions, and expert debates organized in cooperation with fair partners and representatives of the dietary supplements and functional food industry.

NutraFood Poland Gold Medal Competition

As every year, the NutraFood Poland Gold Medal Contest will take place during the fair. Its aim is to identify and promote the best products presented by exhibitors at NutraFood Poland. The winners are selected by the competition jury, which evaluates and chooses the most promising and outstanding products.

The competition is decided in six categories: dietary supplement, raw material, technologies and innovations, contract manufacturing, packaging and product labeling, and booth design and arrangement. Each category has slightly different evaluation criteria. We encourage prospective exhibitors to reserve their booths and submit their entries to the competition!

For another consecutive year, KSM-66 Ashwagandha will serve as the title sponsor of the fair.

Stand reservations are open

Stand reservations for NutraFood Poland 2026 are still underway. We encourage you to secure your participation early and join the group of companies co-creating one of the most important industry events in the region. Detailed information is available on the website www.nutrafood.pl/en as well as via email info@nutrafood.pl

NutraFood Poland

Title Sponsor

KSM-66 Ashwagandha®

International Nutraceuticals & Functional Food Exhibition

14-16.04.2026
EXPO XXI Warsaw
POLAND

A KEY EVENT IN THE DIETARY SUPPLEMENTS INDUSTRY

www.nutrafood.pl

Cosmoprof Worldwide Bologna 2026: The Global Beauty Platform Shaping Tomorrow's Industry

From supply chain to finished product, a worldwide community of 3,000+ exhibitors and 250,000 professionals redefining market evolution.

COSMOPROF WORLDWIDE BOLOGNA

Founded in Bologna over fifty years ago and now widely recognized as the global hub of the beauty industry, Cosmoprof Worldwide Bologna prepares to host

its 57th edition, taking place from March 26 to 29, 2026, reaffirming its role as a strategic platform where the entire international cosmetics supply chain comes together.

"Over time, Cosmoprof has evolved far beyond the dimension of a trade fair, becoming a global platform for dialogue, knowledge exchange, and long-term relationship building," said Gianpiero Calzolari, President of BolognaFiere. "It is where the global beauty industry meets not only to showcase products and solutions, but to interpret market transformations, anticipate emerging trends, and create connections that generate value throughout the year."

This positioning is fully reflected in the 2026 edition, characterized by increasingly balanced participation between European and non-European markets and by a broad, cross-sector, and highly qualified international community.

With more than 250,000 expected visitors and over 3,000 exhibitors from 64 countries representing more than 10,000 brands, Cosmoprof Worldwide Bologna 2026 is completely sold out. The share of new exhibitors - accounting for 37% of the total - confirms the exhibition's strong ability to attract new players and investments. The event's international profile remains robust and well balanced: 56% of exhibitors come from European countries, 20% from Italy, and 44% from non-European markets, reinforcing Cosmoprof's role as a truly global business platform. 32 country pavilions will be featured, organized in collaboration with government institutions, local chambers of commerce, and international partners. Alongside the established presence of major global markets, the 2026 edition

welcomes new national pavilions, including Saudi Arabia, Belgium, Portugal, and Hungary, further expanding the event's geographic and cultural reach.

Internationalization as a strategic foundation

For Cosmoprof, internationalization is the result of a structured and continuous process built on long-standing partnerships, market insight, and strategic planning. With the support of the Italian Ministry of Foreign Affairs and International Cooperation and ITA – Italian Trade Agency, the event will once again host highly qualified delegations from North America, the Middle East and Gulf region, Africa, and Asia-Pacific, strengthening global dialogue between supply and demand.

The strategic scheduling of the 2026 edition, taking place outside the Ramadan period, further enhances engagement with international markets by enabling broader and more active participation from stakeholders in the MENA region, translating into increased international attendance and more effective networking and business opportunities.

Cosmetica Italia – the personal care association, a longstanding partner of the event, also supports the business activities of Cosmoprof Worldwide Bologna 2026. "Cosmoprof Worldwide Bologna continues to represent a privileged meeting point for the entire industry and a key showcase for Italian cosmetics, recognized for their outstanding quality, authentic style, and strong creative identity," said Benedetto Lavino, President of Cosmetica Italia. "The sector, together with its supply chain, generates more than €41 billion in value and identifies internationalization, digital transformation, artificial intelligence,

and sustainable production as the main drivers of growth for 2026."

Business services and a visitor-centric experience

Exhibition performance is also reflected in strong attendance indicators and growing international interest. The Cosmoprof website has recorded a significant increase in new leads, with notable growth from North America (+28%), Europe (+11%), the Middle East (+23%), Asia (+53%), and Africa (+12%). Online ticketing, active since November, shows a highly positive trend, with registered visitors already representing more than 150 countries.

The matchmaking system involving buyers from 94 countries remains one of the event's key business drivers, supported by advanced digital solutions such as Cosmoprof My Match - an exclusive platform enabling industry professionals to schedule business meetings directly at the exhibition - and by a dedicated onsite team. Buyer Lounges located in Halls 14 and 36 provide strategic hospitality services, offering reserved spaces designed for premium, prestige, and mass market channels.

The 2026 edition further enhances its focus on the visitor journey."Being truly visitor-centric means starting from the perspective of professionals who travel to Bologna from all over the world and delivering an efficient, intuitive, and high value-added experience," said Enrico Zannini, General Manager of BolognaFiere Cosmoprof. "In 2026, we further reinforce this approach with a project aimed at improving spatial readability and orientation quality, both physical and digital, to make the exhibition experience more immediate and functional. We are investing in the integration of digital and onsite tools, enhancing the mobile app, and ensuring greater continuity between the platform and the exhibition presence, thus facilitating meeting planning and time management during the event. At the same time, we are expanding the accessibility and cross-sector nature of educational content, making the Cosmoprof experience increasingly comprehensive and valuable for all channels. Strategic partnerships and dedicated incoming services also contribute in this direction, enabling us to transform the quality of hospitality into concrete networking and business opportunities."

An ecosystem aligned with market evolution

Cosmoprof remains the only event worldwide capable of organically representing the entire beauty supply chain, from production to finished products, closely following the real evolution of the market.

Cosmopack, a cornerstone of the international supply chain, will host more than 600 companies from 37 countries. The exhibition will occupy Hall 19, featuring a strengthened machinery sector - with over 90 companies - and new players active in robotics, digital services, and logistics, alongside supply chain companies from the national pavilions of Korea, India, and Poland. Hall 20 will host the Fragrances & Ingredients Zone, a strategic hub dedicated to ingredients and fragrances for the cosmetics industry, fostering dialogue between research, formulation, contract manufacturers, and brand vision. Cosmopack will also be present in Halls 15, 18, 15A, and 28 with solutions in contract manufacturing, private label, primary and secondary packaging, and accessories.

Within the Cosmoprof world, fragrances are playing an increasingly central role in the beauty experience. Hall 36 consolidates its position as a reference point for mass market cosmetics, personal care, and perfumery, while the presence of Esxence in Hall 14 enriches the offering with an immersive olfactory journey dedicated to artistic perfumery and new creative expressions in the sector.

Cosmo Perfumery & Cosmetics will host more than 1,300 companies from 56 countries, with significant growth in the mass market segment (+4.5% in exhibition space), while Cosmo Hair Nail & Beauty Salon will welcome over 1,000 companies from 50 countries, confirming its role as the international benchmark for professional beauty.

The global market landscape

According to data from Euromonitor International, the global beauty and personal care market confirmed a solid and structural growth trajectory in 2025, exceeding €587 billion in value and recording steady increases compared to 2023 and 2024, supported by rising average prices, product innovation, and demand increasingly focused on quality, performance, and specialization. Expansion is particularly driven by premium, prestige, and dermocosmetic segments, which show stronger dynamics than the mass market, reflecting consumers' willingness to invest in high value-added solutions, wellness, and self-care.

Key categories such as skincare, haircare, and fragrances continue to record positive performance, reinforcing the role of beauty as a resilient and countercyclical sector. In this context, 2026 is expected to be a year of further consolidation, with more moderate but stable growth prospects focused on qualitative market evolution rather than simple volume expansion. The fragrances segment confirms itself as one of the most resilient and aspirational pillars of the beauty market, playing an increasingly central role in value creation.

Globally, fragrances continue to benefit from strong premiumization trends, positioning themselves among the most dynamic categories within beauty thanks to high consumer spending propensity and a strong emotional connection with consumers. The sector is fully aligned with the growth of premium and prestige beauty, driven by olfactory innovation, brand storytelling, and the growing relevance of fragrances as identity-driven and collectible objects.

Cosmoprof Worldwide Bologna 2026 confirms itself as a global platform and an international community that continues to grow, evolve, and share a common vision: enhancing beauty as a language capable of creating connections between markets, cultures, and people.

For more information and to discover what's new at Cosmoprof Worldwide Bologna 2026, visit https://www.cosmoprof.com/en/

Fine Foods Introduces Fine Cosmetics Business Unit at Cosmoprof Worldwide Bologna

Cosmoprof Worldwide Bologna is a leading global event for the cosmetics industry, gathering key players from across the beauty supply chain. At its core, Cosmopack showcases advanced solutions spanning ingredients, manufacturing, and packaging technologies. This year, Fine Foods & Pharmaceuticals N.T.M. will present its integrated expertise and "Invisible Expert" approach.

Cosmoprof Worldwide Bologna (26-28 March) has been the premier global forum for the cosmetics industry for more than five decades. Within this unique event, the Cosmopack exhibition is the production chain centrepiece, which encompasses an extensive ecosystem from raw materials and ingredients to fragrances, contract manufacturing, full-service solutions, packaging, process and packing machinery, robotics, automation, logistics, end-of-line operations, inspection, and quality control technologies.

Fine Foods, an independent Italian CSDMO listed on Euronext STAR Milan with family-based governance and expertise in development and production for the nutraceutical, pharmaceutical, and cosmetics sectors, will participate with a dedicated Fine Cosmetics stand and a schedule of exclusive presentations.

Group synergy and the "Invisible Expert" approach

In alignment with its strategic integration across three business units, Nutra, Pharma, and Cosmetics, Fine Foods adopts the "Invisible Expert" philosophy. It prioritises comprehensive service delivery over shelf visibility. Fine Foods positions itself as a strategic partner, supporting customers throughout all stages of product development.

At Cosmopack, Fine Cosmetics, which specialises in cosmetics, will demonstrate its value with its "Invisible Expertise". The Made in Italy excellence of Fine Cosmetics and the Group takes shape through:

- Formulation know-how: translating new concepts and current trends into high-performance products.
- Technological innovation: unique solutions showcased in the latest collections at the exhibition.
- Cutting-edge production: demonstrating operational excellence supporting brands.

Innovation focus: from Solid cosmetics to Elevated beauty

The exhibition highlights Fine Cosmetics' ability to anticipate market developments in the following areas:

- Solid cosmetics and sticks: established deodorant technology is applied to other segments through anhydrous, sustainable, and travel-friendly formulations.
- Elevated beauty: redefining personal and oral care by elevating routine items into refined beauty experiences, featuring innovative textures and enhanced sensory properties.
- In&Out: a collaborative approach developed with the Fine Foods Group's nutraceutical division, offering integrated solutions that merge cosmetics and supplements for a holistic beauty routine.

Consumers seeking beauty and well-being

The Group's **Beauty In&Out** approach addresses evolving consumer demands for holistic beauty and wellness solutions that go beyond surface treatments. The In&Out market is growing quickly, with new launches expanding from nails, hair, and anti-ageing to more categories, reflecting increased demand for integrated and holistic well-being.

Fine Foods business units work together to embed this approach across the organisation. The Group is showcasing In&Out solutions at **Cosmopack** which are designed to meet targeted requirements.

Examples include: a **light legs** treatment pairing a fluid drainage supplement with an innovative cooling gel stick. This practical and targeted solution delivers systemic results and instant relief, making routine care more rewarding.

The **skin and hair treatment** is formulated to protect against exposome factors like pollution, UV rays, and stress, which negatively affect skin and scalp. The protocol uses a topical cosmetic plus a capsule supplement for layered protection.

The **detox** system blends a regenerating water-soluble drink powder supplement with a cream featuring antioxidant and purifying properties. Together, these products provide effective body detox.

Oral care is also approached from an In&Out perspective. A spray and a chewable tablet rebalance oral microbiota and maintain fresh breath all day, addressing the issue at its source.

In the **intimate hygiene** segment, the combined use of a refreshing and rebalancing probiotic mist with a probiotic-based supplement delivers soothing and protective benefits, supporting physiological balance and helping prevent irritation and infections.

Fine Cosmetics CEO and Fine Foods Group Board of Directors member Giovanni Eigenmann said: "Participating as a Group at Cosmopack for the first time is a key opportunity to demonstrate our integrated approach connecting cosmetics, nutraceuticals, and pharmaceuticals. We are introducing the "Invisible Expert" concept at this international trade fair. This is how we interpret our role in the market: our expertise may be invisible, but it is what makes the difference. We are the scientific and industrial partner working behind the scenes, putting our formulation expertise, production technology and strategic vision at the brands' service. Our aim is not shelf visibility but creating value. The "Invisible Expert" turns complex issues into practical solutions, predicts trends, and creates unique, safe, high-performing products. The synergy of our Business Units gives customers a competitive advantage. Fine Cosmetics and Fine Foods see the future of beauty in combining science, technology, and well-being. We support our partners at every stage, from concept to large-scale production, with cross-sector expertise and a modern industrial platform. Being part of Cosmopack as Made in Italy sector leaders provides direct interaction with global buyers and professionals, creating real opportunities for networking and high-value B2B partnerships."

B2B Events Calendar 2026

This is an overwiev of the B2B live events during 2026

Bologna Fiere COSMOPROF
26-29 March, Bologna
https://www.cosmoprof.com/

in-cosmetics global
04-16 April, Paris
https://www.in-cosmetics.com/global/en-gb.html

NutraFood Poland
B2B Nutramedic &Cosmetics MEDIA PARTNER
14-16 April, Warsaw
https://nutrafood.pl/en/

Beauty Asia Singapore 2023
20-22 April, Singapore
https://beautyasia.com.sg/

Making 21-22 April 2026
21-22 April 2026, Coventry
https://www.makingnutra.com/

INTERPHEX
21-23 April, NYC
https://www.interphex.com/en-us.html#/

Vitafoods Europe
B2B Nutramedic &Cosmetics MEDIA PARTNER
05-07 May, Barcelona
https://www.vitafoods.eu.com/en/home.html

Sajam Kozmetike.com - DODIR PARIZA
09-10 May, Belgrade
https://www.sajamkozmetike.com/

CONNECT SOURCE GROW — PLMA's World of Private Label
19-20 May, Amsterdam
https://plmainternational.com/

FOOD MATTERS live
03v-04 June, London
https://foodmatterslive.com/london

Natural Products Expo West

Natural Products Expo West, organized by Informa Markets, is one of the most influential events in the natural products industry worldwide. The event will take place from March 3-6, 2026 at the Anaheim Convention Center in California, United States.

Natural Products Expo West is the leading B2B trade show for the natural, organic, and healthy products industry. Held annually at the Anaheim Convention Center, the event brings together thousands of exhibitors and qualified buyers from across the global CPG and wellness sectors.

The show provides a strategic platform for product discovery, new brand launches, and high-level business networking. Attendees include retailers, distributors, investors, and industry leaders seeking innovation in natural foods, beverages, supplements, personal care, and sustainable products.

The comprehensive conference program delivers expert-led education, market intelligence, and forward-looking insights into industry trends and regulatory developments

BioVivo Science launches U.S.-made natural caffeine from green tea

BioVivo Science, a supplier and manufacturer of premium, science-driven botanical solutions made in the USA, will debut its natural caffeine ingredient at Natural Products Expo West booth 3743B, offering brands a clean-label, plant-based energy solution sourced exclusively from green tea (*Camellia sinensis*).

BioVivo Science's natural caffeine provides formulators with a fully traceable, U.S.-manufactured ingredient that aligns with today's expectations for sustainability, supply chain transparency, and recognizable sourcing.

Unlike synthetic caffeine, which is produced through chemical synthesis or fermentation, BioVivo Science's caffeine is derived solely from green tea leaves and retains naturally occurring polyphenols and antioxidants. This results in a more balanced energy profile that supports sustained alertness without the harsh spikes and crashes often associated with synthetic sources. The ingredient is ideal for functional beverages, gummies, capsules, and sports nutrition applications targeting active, health-conscious consumers seeking clean energy.

"The energy category is experiencing tremendous innovation, and brands have an excellent opportunity to elevate transparency and performance," said Doris Ip, Senior Marketing Manager at BioVivo Science. "Our U.S.-made natural caffeine provides a trusted, plant-based solution with consistent quality, dependable domestic manufacturing, and strong supply chain reliability. It empowers brands to stand out with clean, recognizable sourcing while delivering the balanced energy that today's consumers are actively seeking."

In addition to natural caffeine, BioVivo Science will showcase its expanding U.S.-manufactured portfolio, including:

- American ginseng extract for stress resilience and mood balance
- Broccoli seed for detox and liver support
- Saw palmetto for prostate health and men's wellness
- Stevia and sweetener blends

BioVivo Science will also share exciting news about its upcoming customized solutions designed to support brand innovation across supplements, functional food & beverages, and nutrition categories.

Attendees are invited to visit the BioVivo Science booth 3743B at Expo West to sample functional beverages and gummies that demonstrate real-world applications of its ingredients and explore partnership opportunities.

For more information about BioVivo Science, its portfolio of US-made ingredients, visit www.biovivoscience.com, email info@biovivoscience.com or stop by booth #3743B during the show.

GC Rieber VivoMega launches new vegan DHA+EPA algal oil, expanding its vegan omega-3 portfolio

GC Rieber VivoMega, global leader in highly concentrated and sustainable omega-3 solutions, announces the launch of Algae 1045 TG, its latest high-potency DHA + EPA algal oil. The new addition further expands the company's growing portfolio of vegan omega-3 concentrates designed to meet increasing demand for plant-based alternatives.

Algae 1045 TG delivers a highly concentrated combination of DHA and EPA in triglyceride (TG) form, offering formulators a clean-label, algae-derived omega-3 solution without compromising bioavailability, purity, or sensory quality. Designed to support a wide range of applications, the new variant provides a cost-effective option while maintaining GC Rieber VivoMega's premium quality standards.

The ingredient is produced using GC Rieber VivoMega's proprietary SuperLight™ processing technology, developed exclusively for algae oils. The process utilizes advanced, non-invasive techniques that provide superior oxidation protection while preserving oil integrity. The result is exceptional quality parameters, optimal resource utilization, and minimal to zero waste.

"Consumer demand for sustainable and traceable omega-3 solutions continues to rise, and our new Algae 1060 TG Premium reflects our commitment to combining sustainability, innovation, and commercial flexibility," said Ståle Søfting, Sales and Marketing Director at GC Rieber VivoMega. "Brands today are looking for plant-based omega-3 solutions that deliver both performance and price competitiveness. With this launch, we are providing a high-concentration, certified vegan option that supports formulation efficiency while maintaining the quality and sustainability standards our customers expect."

To learn more about GC Rieber VivoMega's omega-3 portfolio and sustainability practices, schedule a meeting with the team at Natural Products Expo West by contacting vivomega@gcrieber.com or visit https://vivomega.com/products-algae/.

Layn Natural Ingredients lunches NAD, expanding its cellular energy and performance portfolio

Layn Natural Ingredients, one of the world's largest manufacturers and innovators of botanical extract solutions, announces the debut of its new Nicotinamide Adenine Dinucleotide (NAD) ingredient at Natural Products Expo West, booth 3743A.

NAD is a critical coenzyme found in every living cell and plays a central role in mitochondrial function, ATP production, and cellular repair pathways. NAD levels naturally decline with age, and this reduction has been associated with fatigue, reduced metabolic efficiency, cognitive changes, and diminished cellular resilience.

"Our NAD launch reflects the shift we're seeing toward next-generation longevity and cellular energy solutions," said Jim Roza, Chief Scientific Officer of Layn Natural Ingredients. "Consumers today want sustainable energy at the cellular level. By supporting mitochondrial function and metabolic efficiency, NAD delivers foundational support for how we age, perform, and recover. We're excited to provide brand formulators with a high-purity, versatile ingredient that meets both scientific rigor and market demand."

This launch follows Layn's launch of its NMN solution, establishing a dual approach to support healthy aging and cellular performance. NMN functions as a NAD+ precursor, supporting endogenous NAD replenishment over time, while NAD delivers direct coenzyme support for immediate mitochondrial energy production and metabolic activity. By offering both NMN and NAD, Layn provides formulators with flexible tools to target multiple points along the cellular energy pathway, and develop solutions that bridge longevity, performance, and active lifestyle demands.

Layn's NAD is produced via enzymatic catalysis, offering ≥99% purity, excellent water solubility, and availability in powder and granular formats for flexible formulation across capsules, stick packs, functional beverages, and performance nutrition applications. The ingredient is positioned for brands targeting adults focused on sustained productivity, recovery, cognitive clarity, and metabolic health.

In addition to NAD and NMN, Layn will showcase:

- Its extensive tea extracts and instant tea profiles
- A comprehensive health & wellness portfolio including quercetin, rhodiola, and resveratrol
- Branded functional ingredients such as Galacan®, Sophorox®, and bio+ Series (bio+Resveratrol, bio+Quercitrin)
- Global leadership in monk fruit and stevia natural sweeteners (world's largest manufactuer and innovator), with monk fruit achieving Gold-level recognition under SAI's Farm Sustainability Assessment (FSA) and stevia recognized at the Silver level for sustainability
- Next-generation sweetener innovations such as SteviUp® M2, designed to deliver improved solubility and cleaner taste performance
- Natural Preservation solutions designed to extend shelf life while maintaining clean-label integrity.

Layn is also inviting Expo West attendees to visit booth#3743A for a special booth happy hour on March 5 from 2-5 PM PT, featuring mocktails infused with Layn's functional ingredients.

For more information about Layn's NAD and NMN products, visit https://layncorp.com, email botanify@layn-usa.com, or stop by booth #3743A during the show.

GOED Celebrates 20 Years of Worldwide Leadership on Global Omega-3 Day

As the world celebrates Global Omega-3 Day™ (March 3), the Global Organization for EPA and DHA Omega-3s (GOED) marks a monumental milestone: its 20th anniversary. Since its founding in 2006, GOED has transformed from a small group of visionary companies into a global powerhouse representing the entire EPA and DHA omega-3 supply chain, dedicated to improving public health by increasing the consumption of these important fatty acids.

Two decades of impact

In the 20 years since its inception as a spinoff from a Council for Responsible Nutrition working group, GOED has emerged as the authoritative voice for the omega-3 industry. Key achievements include:

- **The GOED voluntary monograph:** This has served as THE quality standard for the omega-3 category. GOED member companies must voluntarily adhere to strict standards of quality and ethics as outlined in the monograph as a condition of membership. This promotes excellence in the omega-3 industry and enhances consumer trust for GOED member products.
- **Global advocacy:** GOED has a proven track record of successfully petitioning for international standards and intake recommendations, including supporting Article 13 claims in the European Union in 2011, advocating for a Codex Fish Oil Standard in 2017, achieving a qualified blood pressure health claim in the US in 2019, and securing adjustments to a proposed contaminants regulation around MOAH (mineral oil aromatic hydrocarbons) in the EU in 2024.
- **Consumer education campaign:** With the support of an industry-wide coalition, GOED organized a consumer education campaign in the US in 2015 that increased omega-3 supplement sales

and changed the tone of the consumer media conversation about omega-3s. This initiative led GOED to set up a series of consumer-facing platforms, including AlwaysOmega3s.com, which allows the organization to continue wide-reaching consumer education efforts.

- **Scientific and technical leadership:** GOED has developed powerful tools to assist members in navigating the global scientific and technical landscape. These include the:
  - Clinical Study Database, which has indexed the more than 50,000 published studies on EPA and DHA omega-3s and cataloged 5,000 human studies in a searchable, filterable format by population, dosage, outcome, etc. – essentially a PubMed solely for EPA and DHA omega-3 science.
  - Global Omega-3 Navigator, an interactive tool with regulatory and technical information relevant to the omega-3 industry from around the globe to help members understand claims, recommended intakes, quality standards and more.

Celebrating Global Omega-3 Day 2026

March 3 (03-03) was chosen as Global Omega-3 Day to highlight the critical "gap" between current global intake of EPA and DHA omega-3s and what the body requires for optimal health. Despite an abundance of research on the benefits of omega-3s for heart, brain, eye, and prenatal health, a staggering 90% of the global population still does not consume enough EPA and DHA.

"Our 20th anniversary is a time to celebrate how far we've come, but it's also a call to action," said Ellen Schutt, Managing Director of GOED. "The scientific basis for EPA and DHA for overall health is overwhelmingly positive, but the intake gap remains. Our mission for the next 20 years is to move from awareness to action, ensuring that every person understands that EPA and DHA intake is foundational to human health."

GOED has three simple ways to help people get more omega-3s:

- Eat fatty fish (like salmon, sardines or mackerel) at least twice a week.
- Take an omega-3 supplement made from fish, krill or algal oils to reach the recommended 500 mg daily intake.
- Choose EPA/DHA fortified foods and beverages like milk and yogurt when available as options.

Looking ahead: the future of omega-3s

Later this month, GOED will continue its anniversary celebration at the GOED Exchange 2026 in Singapore (March 17–19), where industry leaders will discuss the future of the category – including innovations in science, production and even messaging – to help meet the growing global demand.

About GOED

GOED is the Global Organization for EPA and DHA Omega-3s, a not-for-profit trade association committed to use science-based information to promote the consumption of and enable access to quality EPA & DHA from all sources for a positive impact on public health. For more information, visit goedomega3.com or alwaysomega3s.com

The Gut–Skin Axis: Where Does Acne Begin?

Acne vulgaris is increasingly recognized not merely as a localized skin disorder, but as a complex systemic condition influenced by hormonal, metabolic, and microbial factors. Emerging evidence highlights the pivotal role of insulin signaling and gut microbiome dysbiosis in driving inflammation and sebaceous activity. This evolving perspective supports a shift toward integrative therapeutic strategies targeting the gut–skin axis.

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Introduction: acne as a modern disease

Acne vulgaris affects up to 90% of adolescents in developed countries, making it one of the most prevalent dermatological conditions worldwide[1-2]. Its high occurrence is not limited to youth, as a substantial proportion of adults also experience this skin condition, underscoring its persistence beyond adolescence[2-3]. Acne is considered a civilization disease: while extremely widespread in urban environments of the Western world, it is very rare in undeveloped societies living as hunter-gatherers without contact with the modern world[3-4].

Acne vulgaris is a chronic inflammatory disorder of the pilosebaceous unit, characterized by increased sebum production leading to non-inflammatory comedones and inflammatory lesions such as papules, pustules, or nodules[5-6]. The etiology is associated with alterations in sebum production under androgen control, altered keratinization processes, and increased release of inflammatory mediators[5,7-8]. When obstruction of the pilosebaceous unit occurs, anaerobic and lipid-rich conditions develop that provide an optimal microenvironment for the growth of *Cutibacterium acnes*. This obstruction and increasing *C. acnes* proliferation are central factors in the onset of inflammatory acne lesions. Adolescents with acne have significantly higher *C. acnes* counts compared to healthy controls, which correlates with acne flares driven by high levels of hormones and sebum production[5]. Specific host factors, such as sebum production, hormone levels, the inflammatory milieu, and physical changes in the pilosebaceous unit, contribute to acne pathogenesis, indicating that certain *C. acnes* strains can become pathogenic under different conditions or specific environmental stimuli[5,9-10].

Hormonal influences: beyond sex hormones

Recently, there has been increasing discussion about the importance of insulin as a significant hormone in the pathogenesis of acne[11-12]. Although insulin's primary role is to regulate blood glucose concentration and its storage in the body's cells, insulin has much broader effects on the skin[11]. Insulin stimulates the activity of sex hormones, particularly androgens, which directly leads to increased sebum

secretion[11,13]. Furthermore, elevated insulin levels promote keratinocyte proliferation and abnormal keratinization, contributing to acne formation[11,13]. Additionally, insulin promotes inflammatory responses in the skin, contributing to the development and aggravation of acne[11-12]. Therefore, it is not surprising that elevated insulin levels and insulin resistance are significantly more common in patients with acne compared to healthy individuals[11-13].

Discovering the gut-skin axis

While traditionally viewed as a local skin problem involving excess sebum production, follicular hyperkeratinization, and bacterial colonization, emerging research reveals acne as a systemic condition influenced by the gut-skin axis, a bidirectional communication network between intestinal microbiota and skin health[14-17]. The skin–gut health concept underscores the connection between intestinal dysbiosis and impaired skin homeostasis, providing a framework for understanding why many skin disorders are linked with intestinal comorbidities and highlighting the crucial role of gut microbiota in driving the pathogenesis of diverse inflammatory skin diseases[17].

The human body maintains constant contact with its external environment primarily through two major interfaces: the skin and the gastrointestinal tract[18]. The gastrointestinal tract represents one of the largest interfaces between the host and its environment, colonized by large numbers of microbes that significantly impact host health. Similarly, the skin epidermis, along with appendage structures such as sweat and sebaceous glands, provides approximately 25 m² of epithelial surface for microbial interaction. Both organs function as critical barriers for immune function[19-20].

These barrier surfaces harbor distinct yet interconnected microbial ecosystems, collectively termed the microbiome, which exists as two bidirectionally related systems: the gut microbiome and the skin microbiome[18-20].

Despite different embryonic origins, skin arising from ectoderm and gut forming from interactions between endoderm and mesoderm, these organs share fundamental structural and functional similarities. Both are lined by epithelial cells that serve as protective barriers, supported by underlying stromal and immune cells[18]. Furthermore, both surfaces are extensively vascularized and innervated, facilitating rapid communication with immune and central nervous systems[18,20].

The microbiomes at these sites play crucial roles in maintaining host health by shaping the immune system, protecting against pathogenic microorganisms, breaking down metabolites, and maintaining healthy barrier function[20].

Modern lifestyle and microbiome disruption

The modern way of life is one of the key factors disrupting the balance of the gut microbiome. Diet, in particular, represents one of the primary determinants of its composition and function, and gut microbiome dysbiosis has been linked to disturbances in skin homeostasis[21]. A Western-style diet, marked by high intake of ultra-processed foods, saturated fats, and refined sugars, is considered a contributing factor to the worsening of acne[17]. A study published in 2018 further supported this concept by comparing the gut microbial composition and functional profiles of individuals with acne to those of healthy controls. The findings indicated reduced microbial diversity and a lower *Firmicutes-to-Bacteroidetes* ratio in patients with acne, a pattern consistent with a gut microbiota configuration commonly associated with a Western dietary enterotype. Within this context, the most significantly decreased microbes in acne patients were *Clostridia, Clostridiales, Lachnospiraceae*, and *Ruminococcaceae*, which are considered potentially beneficial, further highlighting specific gut microbiota alterations linked to the condition[15]. Another study identified associations between acne vulgaris and alterations in the gut microbiota. At the phylum level, *Actinobacteria* were reduced while *Proteobacteria* were elevated in patients with acne. At the genus level, several potentially beneficial microbes, including *Bifidobacterium, Butyricicoccus, Coprobacillus, Lactobacillus*, and *Allobaculumm* were found to be decreased[22].

Gut microbiome dysbiosis as a foundational factor

There is a growing consensus that the "gut-skin axis" plays a central role in the development of acne, where an imbalance in intestinal flora (dysbiosis) acts as a primary driver of the condition[23]. This disruption triggers a cascade of systemic issues, including compromised skin barrier function, hormonal fluctuations, heightened inflammatory signaling, and metabolic shifts. Consequently, clinical interest has pivoted toward the use of probiotics, beneficial live microorganisms, as a therapeutic intervention to restore this internal equilibrium[24].

Probiotics in acne therapy: four key mechanisms

Probiotic interventions are categorized into topical applications directly on skin lesions and systemic (oral) administration. While early American research in the 1960s suggested that oral probiotics could improve acne in the majority of patients, modern high-quality evidence has clarified four specific pathways through which they function[25].

1. **Counteracting antibiotic disruptions:** Protecting the natural gut ecosystem from the collateral damage of long-term antibiotic use.
2. **Pathogen suppression:** Directly or indirectly lowering the levels of *Cutibacterium* acnes within the skin's microenvironment.
3. **Inflammation modulation:** Shifting the body's immune response from a pro-inflammatory state to a regulatory, anti-inflammatory state.
4. **Metabolic and hormonal regulation:** Improving insulin sensitivity and metabolic markers that influence sebum production.

Preserving the gut ecosystem during antibiotic use

Antibiotics remain a cornerstone of acne treatment, yet their non-selective nature often decimates beneficial gut bacteria, leading to secondary

health issues[26]. Integrating probiotics into an antibiotic regimen has been shown to preserve intestinal integrity and enhance the overall efficacy of the acne treatment by mitigating systemic inflammation[27].

Regulating the skin microbiome and immune response

Probiotics influence the skin's health through "immunomodulation." By interacting with the gut's immune cells, probiotics can alter the systemic release of cytokines. This shift reduces the localized redness and swelling of acne by training the immune system to respond more efficiently to pathogens like *C. acnes* without overreacting[28].

Addressing metabolic pathways and insulin resistance

Perhaps most critically, probiotics address the metabolic underpinnings of acne. Dysbiosis is frequently linked to insulin resistance, which stimulates the hormones responsible for excessive oil production. Research indicates that specific probiotic strains (notably from the *Lactobacillus* family) can improve insulin signaling and glycemic control, thereby treating a root metabolic cause of skin eruptions[29].

Conclusion: a holistic shift in acne care

Contemporary science recognizes that the efficacy of probiotics is highly strain-specific. While variables such as dosage and duration are still being refined, the shift toward addressing the gut-skin axis marks a transition from symptom suppression to holistic healing. By stabilizing the internal environment, specifically the microbiome and metabolic health, clinicians can achieve more sustainable improvements in skin clarity[17].

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Nutriose® soluble fibers from Roquette achieve NutraStrong™ Prebiotic Verified certification

Roquette, a global leader in sustainable plant-based solutions, announces that its Nutriose® soluble fibers that hold clinical evidence of health benefits have now also gained NutraStrong™ Prebiotic Verified product certification from SGS Nutrasource.

NutraStrong™ Prebiotic Verified, which is provided by the third-party certification body SGS NutraSource, is an industry-spanning program that validates the efficacy of prebiotic ingredients. By establishing clear benchmarks regarding manufacturing quality, label compliance and testing protocols, NutraStrong™ safeguards against misleading claims and ensures that only science-based products earn its seal of approval.

Through a rigorous evaluation process, Nutriose® FM 06, Nutriose® FB 06, and Nutriose® FM 15S soluble fibers were found to meet stringent criteria set by SGS Nutrasource in quality manufacturing and science-based claims through clinical evidence to support prebiotic function.

"With proven prebiotic effect, Nutriose® fibers offer our customers a science-backed solution for gut health and overall well-being. This certification illustrates the high standard of our quality and scientific evidence, and further underlines our dedication to delivering innovative prebiotic ingredients that our customers and consumers can trust," said Iva François, Global Product Marketing Leader for Fibers at Roquette.

Strong endorsement for plant-based prebiotic fibers

The Nutriose® portfolio has been developed to help consumers increase their intake of this critical nutrient. Nutriose® is a range of non-GMO corn or wheat soluble fibers with clinically proven health benefits and excellent digestive tolerance.

With a neutral taste, high solubility, and outstanding process stability, Nutriose® enables manufacturers an easy integration across food and beverages applications, without altering original tastes or textures.

Research shows that Nutriose® promotes beneficial bacteria in the gut and modulates the gut environment.[1,2,3,4] Moreover, Nutriose® has demonstrated microbiota-related health benefits such as blood glucose management, satiety, weight management and sustained energy release.[5] More recent studies demonstrate initial evidence around immune health and mental wellbeing. Roquette has 25 years of scientific expertise in the fiber field, supported by more than 26 clinical studies and over 30 preclinical studies.

Feeding consumer appetite for fiber-fortified food

Consumers are increasingly interested in fibers and prebiotics in food and beverages, largely due to their associated gut health benefits. Consumers see gut health as a gateway to holistic wellness, with 59%[6] of them believing gut health is important for the entire body. Moreover, awareness about prebiotics is growing: 64% of people globally have heard of them–with over half of those (52%) having purchased prebiotic products in the last twelve months.[7] As such, investment in fiber-focused innovations is expected to significantly grow over the coming years.

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Regulatory Update: Tea Tree Oil (*Melaleuca alternifolia* Leaf Oil) – CMR Classification Discussion, SCCS Final Opinion and EU Regulatory Timeline

Recent regulatory developments concerning tea tree oil (TTO) have attracted significant attention across the cosmetic industry, particularly following discussions on potential CMR classification and the publication of the SCCS Final Opinion in November 2025. This update summarises the current regulatory situation and outlines practical steps cosmetic brands should consider.

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Background: why tea tree oil is under regulatory scrutiny

Tea tree oil has been subject to harmonised classification discussions under the CLP Regulation.

In November 2023, the Risk Assessment Committee (RAC) of the European Chemicals Agency (ECHA) adopted an opinion supporting classification of tea tree oil for reproductive toxicity Category 1B under CLP.

CMR Category 1B refers to substances that are presumed to be toxic for human reproduction, primarily based on animal data, with sufficient evidence to indicate potential relevance for humans.

Under Cosmetic Regulation (EC) No 1223/2009, substances classified as CMR Category 1A or 1B are, in principle, prohibited in cosmetic products unless specific exemption criteria are fulfilled. One of the key elements enabling continued cosmetic use is a positive safety evaluation by the Scientific Committee on Consumer Safety (SCCS) for defined conditions of use.

Importantly, CMR classification does not automatically mean an immediate ban, but it significantly increases regulatory scrutiny and justification requirements.

SCCS final opinion (adopted October 2025, published November 2025)

In its Final Opinion, SCCS concluded that tea tree oil can be considered safe when used within specific concentration limits and under defined conditions.

Maximum safe concentrations were established for selected product types:

- Up to **2.0%** in shampoos
- Up to **1.0%** in shower gels
- Up to **1.0%** in facial cleansing products
- Up to **0.1%** in face creams (leave-on)

The safety conclusion applies only when additional requirements are fulfilled.

Key conditions of safe use highlighted by SCCS

Use is considered acceptable only if:

- Tea tree oil complies with **ISO 4730 quality specifications**
- The product is intended for **dermal use in adults**
- The product is **not used in aerosol or spray formats**, due to inhalation exposure concerns
- Stability of tea tree oil in the finished formulation is demonstrated
- Oxidation and compositional changes during storage are controlled

SCCS also confirms that tea tree oil should be considered a **moderate skin sensitiser**, requiring appropriate risk assessment and product design considerations.

Key regulatory timeline for tea tree oil (EU)

The discussion around the classification of tea tree oil as a CMR Category 1B substance began following the RAC opinion in November 2023, which triggered potential regulatory consequences under EU cosmetics legislation.

A possible regulatory derogation pathway led to the SCCS safety assessment process.

Key regulatory milestones

- **November 2023** — RAC opinion supporting Reproductive Toxicity Category 1B classification
- **6 June 2025** — SCCS Preliminary Opinion published
- **18 August 2025** — Deadline for public consultation
- **October 2025** — SCCS Final Opinion adopted
- **14 November 2025** — SCCS Final Opinion published
- **July 2026 (tentative)** — Potential regulatory implementation timeline for restrictions or bans, depending on final EU regulatory decisions

If no further regulatory derogation or adjustment is granted, products exceeding established safe-use limits may no longer be permitted on the EU market.

Practical implications for cosmetic brands

Although tea tree oil is not currently banned from cosmetic use, regulatory pressure remains high. Companies are advised to take a proactive compliance approach.

Recommended actions include:

1. Portfolio review

Identify all products containing tea tree oil and verify concentration levels against SCCS safe use ranges.

2. Raw material compliance

Request supplier confirmation of ISO 4730 compliance and detailed compositional specifications.

3. Stability assessment

Evaluate oxidation potential and composition drift during shelf life.

4. CPSR update

Ensure safety assessments reflect SCCS conclusions, sensitisation potential, and exposure assumptions.

5. Product format review

Avoid or carefully reassess aerosol or spray concepts containing tea tree oil.

Strategic outlook

Tea tree oil remains permitted under defined safe-use conditions. However, further regulatory developments cannot be excluded, particularly if harmonised CMR classification progresses further into binding legislation or if additional risk management measures are introduced at EU level.

Brands using Tea tree oil are advised to maintain strong technical documentation, supplier traceability, and robust safety justification within the Product Information File.

Conclusion

Tea tree oil continues to be a valuable cosmetic ingredient, but its regulatory status requires increased technical diligence. Compliance will increasingly depend not only on concentration limits, but also on raw material quality, formulation stability, and scientifically justified safety assessment.

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Challenges and Difficulties of Small-Scale Cosmetic Producers in Practice, Part 3

This third part of the series focuses on practical, real-world issues that repeatedly appear in small-scale cosmetic production - not as isolated mistakes, but as structural challenges resulting from limited access to regulatory knowledge, technical training, and industry-standard manufacturing practices.

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Story 7: weight vs. volume - why "mL" is not acceptable in a formulation

In small-scale cosmetic manufacturing, many formulations are still written the way recipes are written: a mix of grams for solids and milliliters for liquids. It feels logical. It feels practical. And it feels "close enough".

But in professional cosmetic formulation - and in regulatory documentation - this approach is a fundamental mistake. A cosmetic formula is not a kitchen recipe. It is a controlled, reproducible specification. And for that, the only reliable unit is mass.

The problem: volume depends on density

A milliliter is not a fixed amount of "ingredient". It is a fixed amount of volume - the physical volume the material occupies in a laboratory container. Volume is defined as the amount of three-dimensional space occupied by a substance. Unlike mass, volume changes with density.

The actual amount of ingredient you add depends on density - and density is not constant across raw materials. There is only one commonly used ingredient where milliliters and grams can be considered equivalent under standard conditions: water. 1 mL of water is approximately equal to 1 g of water.

A few real-world examples:

- 10 mL of decyl oleate does not weigh the same as 10 mL of almond oil,
- 10 mL of olive oil does not weigh the same as 10 mL of castor oil.

Plant oils, in particular, vary by batch, origin, fatty acid profile, and temperature.

A formula written in mixed units creates a basic question with no defensible answer: What is the actual concentration in the finished product? The only way to be certain and confident is to weigh each and every ingredient and calculate concentration as mass fraction (% w/w). In cosmetic science, precision is not optional - it is the foundation of safety.

Story 8: drops are not a measurement - the hidden risk of dosing essential oils by drops

Why "a few drops" is not a cosmetic formulation parameter

In small-scale cosmetic production, essential oils are often still described using drops - "10 drops of lavender", "5 drops of tea tree", or similar instructions. This approach originates from aromatherapy and hobby formulation. However, once a product is placed on the cosmetic market, this method becomes technically unreliable.

A cosmetic formula must be measurable, reproducible, and auditable. A drop is none of these.

Why this matters: essential oils are complex active ingredients

Essential oils are not only fragrance components. They are complex mixtures of biologically active substances and may contain:

- skin sensitizers,
- phototoxic substances,
- restricted constituents,
- fragrance allergens with declaration thresholds.

Without precise measurement, it becomes impossible to:

- verify compliance with fragrance standards,
- calculate allergen declaration requirements,
- perform reliable safety assessment exposure calculations.

If the exact amount is unknown, the risk cannot be properly assessed.

The professional solution: convert drops into weight and fix the formula in % w/w.

The transition is simple. During development:

- determine the mass corresponding to a defined number of drops under controlled conditions by weighing the dispensed material.
- convert this value into **% w/w** in the final formula.

During manufacturing:

- weigh essential oils using calibrated scales.
- record weighed amounts in batch documentation.

This ensures reproducibility, supports safety assessment, and protects both the manufacturer and the consumer. In cosmetic formulation, a drop may feel precise - but only weight can prove it.

Story 9: when cosmetics look like food - creativity vs. consumer safety

Why food-like cosmetics are more than a design choice

Small cosmetic brands often build their identity through creativity and sensory storytelling. However, one area where creativity can create real safety and legal risks is cosmetics that visually imitate food.

This is especially common in small-scale production of soaps shaped like cakes, cupcakes, desserts, chocolates, or fruits. While these products may be

visually attractive and fun, they can create a foreseeable safety risk - especially for children.

Why this matters: risk of accidental ingestion

Products that look, smell, or are packaged like food may be confused with food. This creates a foreseeable ingestion risk. Children are particularly vulnerable because they rely on visual recognition, they associate sweet smells and colours with food, they cannot reliably distinguish product categories. If a cosmetic product can reasonably be mistaken for food, it creates a safety hazard regardless of the manufacturer's intention.

The regulatory principle: preventing confusion, not creativity

Council Directive 87/357/EEC specifically addresses this issue and is reflected within the safety framework of Cosmetic Regulation (EC) No 1223/2009.

Products that:

- are not food,
- resemble food in appearance, smell, or packaging,
- and may be confused with food by consumers

are considered unsafe because they may encourage accidental ingestion. The regulatory focus is not on limiting creativity, but on preventing predictable misuse.

Food-inspired naming or marketing concepts may be acceptable when clear cosmetic identity is maintained, but only if combined with standard cosmetic packaging, clear cosmetic labelling and no realistic edible appearance. The key factor is clear product identity.

If the product could realistically be mistaken for food by a child, it creates a safety and compliance risk. Separating storytelling from physical product design is often the safest strategy. In cosmetic design, creativity should attract attention - not create confusion. And true product creativity should always be intentional, informed, and safety-driven.

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New Study Shows Tocotrienols Outperform Tocopherols in Preventing Ferroptosis

A new study published in *Scientific Reports* reveals that tocotrienols, a lesser-known form of vitamin E, are significantly more effective than tocopherols in preventing ferroptosis[1], a regulated form of cell death driven by iron-dependent lipid peroxidation and increasingly implicated in ageing and age-related conditions.

The study, led by researchers from Tohoku University, Japan, provides a comprehensive comparison of all major vitamin E analogs, demonstrating that tocotrienols supress ferroptosis at much lower concentrations than tocopherols across multiple experimental models. The researchers employed multiple ferroptosis models, advanced lipid peroxidation assays and genetic validation to ensure robust and reproducible findings.

The ferroptosis-preventing activity of vitamin E analogs was evaluated using human sarcoma HT-1080 cells, a well-established model in ferroptosis research due to their high susceptibility to ferroptosis.

In addition to their superior potency, the study provides mechanistic insight into how tocotrienols more effectively intercept lipid peroxidation cascades central to ferroptotic cell death.

Key findings include:

- Tocotrienols demonstrated significantly stronger anti-ferroptotic activity than tocopherols across multiple experimental systems, including both chemical induction and genetic deletion models.
- In glutathione peroxidase 4 (GPX-4) deficient ferroptosis models, tocotrienols effectively inhibit ferroptosis with approximately 15-fold greater potency compared with tocopherols.
- Tocotrienols more effectively suppressed lipid peroxidation, the core biochemical driver of ferroptosis, as demonstrated in both cell-free and cellular lipid oxidation assays.
- At biologically effective concentrations, tocotrienols exhibited lower cellular cytotoxicity compared with commonly used experimental ferroptosis inhibitors.

Why researchers are focusing on ferroptosis

Ferroptosis is a newly recognised form of programmed cell death that was only clearly defined in the past decade. Unlike apoptosis or necrosis, it is driven by iron overload, lipid peroxidation of cell membranes, and failure of key antioxidant defence systems such as glutathione and GPX4. When these processes occur together, they trigger rapid and irreversible cell damage.

Research has since shown that ferroptosis is a common underlying mechanism in many chronic diseases, including neurodegenerative disorders, cardiovascular disease, metabolic conditions, organ injury and ageing-related inflammation. Because ferroptosis links iron metabolism, lipid oxidation and oxidative stress, it has emerged as an attractive target for both disease prevention and therapy, with the potential to impact multiple conditions simultaneously.

Supporting evidence from related research

Previous research has also highlighted the role of naturally occurring lipid metabolites in modulating ferroptosis. In a 2023 study[2], Sun and colleagues reported that squalene and coenzyme Q10 (CoQ10), key intermediates in the cholesterol biosynthesis pathway contribute to the suppression of ferroptosis by limiting lipid peroxidation and protecting cellular membranes from oxidative damage.

Taken together with the current findings, these studies reinforce the emerging concept that lipid-based antioxidants such as tocotrienols and squalene play a significant role in the regulation of ferroptosis. Collectively, this growing body of evidence supports increasing interest in multi-lipid antioxidant strategies for targeting ferroptosis in the context of ageing and chronic disease.

"Not all forms of vitamin E are created equal", said Dr. Ariati Aris, Scientific Affairs Specialist at Phyto-Gaia. "Tocotrienols exhibit superior antioxidant behaviour in the specific context of ferroptosis, suggesting they may play an important role in cellular protection than previously recognized. These results provide strong support for the growing interest in tocotrienols in the fields of healthy ageing, metabolic health and oxidative stress management. While further in-vivo and clinical studies are needed, these findings position tocotrienols as promising candidates for future nutritional, functional food and wellness applications".

"This study highlights how tocotrienols are more effective in preventing ferroptosis, a key pathway in ageing, while squalene provides complementary membrane protection. For the nutraceutical industry, it opens exciting new opportunities for science-backed longevity innovation and product developments.

PhytoGaia's novel and latest branded ingredient – STGaia® (synergistic complex of tocotrienols and squalene, naturally extracted from palm fruits) delivers a powerful, dual-lipid approach to support healthy ageing at the cellular level. We look forward to partnering with brand owners to translate this science into innovative anti-ageing/longevity products," added Mr Bryan See, Vice President of PhytoGaia.

For more information contact PhytoGaia at info@phytogaia.com

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PhytoGaia

About PhytoGaia Sdn. Bhd.

PhytoGaia Sdn Bhd (www.phytogaia.com) develops and supplies unique full spectrum tocotrienols/tocopherol complex (TocoGaia®), natural palm-mixed carotene complex (CaroGaia®) and natural plant squalene with tocotrienols/tocopherol complex (STGaia®) to the various markets worldwide. With over 30 years of expertise in palm phytonutrients, PhytoGaia develops clean-label, high-quality phytonutrients that support human health, as well as pet wellness. Its pet-focused portfolio includes PetGaia™ (a palm fruit extract) and MCTGaia™ (medium chain triglycerides). PhytoGaia partners with formulators and brands worldwide to deliver clean, innovative and science-backed solutions.

PhytoGaia is the only tocotrienols company to receive two consecutive NutraIngredients-Asia Awards (2024 – Start Up and 2025 – Ingredient of the Year – Healthy Ageing), an international recognition of its leadership and innovation in palm phytonutrient solutions.

WINNER NUTRA INGREDIENTS ASIA AWARDS 2024

STGaia Ingredient of the Year Healthy Ageing

WINNER NUTRA INGREDIENTS ASIA AWARDS 2025

Be Active in the "Inner Beauty" Movement: Discover Verisol® by Gelita at in-cosmetics Global 2026

At this year's in-cosmetics global, Gelita invites visitors to "Be Active!" and experience the science behind Beauty from Within. From April 14-16, 2026, in Paris, Gelita will showcase its proven Bioactive Collagen Peptides brand Verisol® in the new "Inner Beauty" area (Booth 2R140).

As consumer demand for natural and evidence-based beauty solutions continues to rise, Beauty from Within has become one of the most dynamic segments in the personal care and nutricosmetics markets. Verisol® provides beauty brands with a clinically supported ingredient to power formulations that promote visibly improved skin elasticity, stronger hair, and healthier nails - from the inside out.

Developed specifically for Beauty from Within applications, Verisol® stimulates extracellular collagen matrix metabolism in the skin through targeted Bioactive Collagen Peptides.

Multiple scientific studies demonstrate its efficacy with a daily dose of only 2.5g and make it "The Gold Standard" in this category. Therefore Verisol® is the ideal choice for brands seeking to differentiate their product portfolios with reliable results and strong consumer appeal.

At in-cosmetics global 2026, Gelita experts will be on hand to discuss how Verisol® can support innovation projects in the cosmetics, personal care, nutricosmetics, and supplements sectors.

Visitors to booth 2R140 can explore the science, application concepts, and marketing potential of this unique ingredient – and learn how to make their formulations stand out in the growing Inner Beauty market.

Be active. Be beautiful. From within.

Visit Gelita at Booth 2R140.

Seafood Supplements Sector Getting Serious on Sustainability

Sales of sustainable seafood supplements, such as marine collagen and cod liver oil, doubled last year in the UK and Ireland. The £12.8m spent by shoppers on the supplements certified to the Marine Stewardship Council's Standard for sustainable fishing, represented a 99% increase on the 2024 total, boosted by more brands selling a wider range of MSC labelled products.

The UK and Irish market for supplements carrying the MSC blue ecolabel has now almost overtaken China, leaving just the US and Canada as the leading marketplace for these increasingly popular products, according to the recently published MSC UK & Ireland Market Report.

With four brands - Ancient and Brave, Bare Biology, Planet Paleo, and Zinzino - now selling MSC certified marine collagen, this subsector of the supplement market looks set to experience rapid growth as this skincare product enjoys a major boost in popularity. For consumers keen to reduce the environmental impact of their cosmetics, MSC certified marine collagen not only comes from healthy stocks of white fish but also uses by-products that would otherwise be wasted.

Cod liver oil and other omega-3 fish oil products remain the biggest selling certified supplements, with Morrisons and Tesco the two retailers using the MSC label on their own-brand supplements range.

Rowan Williams, MSC UK & Ireland Commercial Officer, said: "The near 100% rise in sales of certified supplements is good news and underlines the huge potential in this sector; one which presents a clear opportunity for other retailers to increase their range of certified sustainable products. Given the increased consumer demand for certified sustainable products, even amidst economic difficulties, it is vital that this sector is safeguarded for the future through sustainable fisheries management practices."

Wiley's Finest, which uses MSC labelled Alaska pollock for its extensive range of fish oil products, celebrated a decade of certification in 2025, and its parent business, Wiley Companies, has been certified since 2011, as long as any other supplements company in the world.

Paul Farquhar, Managing Director at Wiley's Finest, said: "We've been MSC-certified since the very beginning because we believe that producing high-quality Omega-3 supplements and protecting ocean health must go hand in hand. People are increasingly recognising that their purchasing decisions have real environmental consequences and are actively seeking products that align with their values. We want to ensure that the wild fish populations we depend on today will continue to thrive for generations to come. MSC certification gives consumers confidence that the supplements they're buying come from responsibly managed fisheries, with full traceability from ocean to capsule. We're proud to be part of this movement and encouraged to see the broader industry embracing sustainable sourcing."

The growth in the supplement market contributed to a 14% increase in overall retail sales of MSC labelled products in the UK and Ireland in 2025 – rising to £1.7bn.

About the MSC

The Marine Stewardship Council (MSC) is an international non-profit organisation which sets globally recognised, science-based standards for sustainable fishing and the seafood supply chain.

The MSC ecolabel and certification programme recognises and rewards sustainable fishing practices and is helping to create a more sustainable seafood market. For more information visit msc.org/uk.

More to explore at this year's Vitafoods Europe!

From 5-7 May 2026, Vitafoods Europe returns to Fira Barcelona. With registrations now open, the stage is set for three days dedicated to progress, partnership and possibility – and a show designed to deliver more to see, more to learn and more to love.

What to expect

Spanning in-depth technical learning and trend-led discussion, Vitafoods Europe 2026 will create a space for fresh perspectives and meaningful innovation – with new and expanded features sitting alongside returning fan favourites. Long-standing features such as the Vitafoods Europe Conference and Vitafoods Insights Theatre will once again anchor the content programme, offering expert-led sessions on the scientific, commercial and regulatory forces shaping nutraceutical development.

Across the show, you can expect focused sessions that provide practical insights across the supply chain – from ingredients and formulation through to finished products and go-to-market strategies. More to come on the agenda soon!

New for 2026 are spotlight sessions, which will shine a light on some of the most dynamic and fast-evolving areas shaping nutrition industry innovation. Taking place on day three of the show, dedicated content on weight management will examine how the nutrition industry is adapting to a seismic shift in healthy weight strategies. With around 1.6 million adults in Great Britain and 13% of the U.S. population now using GLP-1 medications, these sessions will explore how personalised nutrition, functional foods and metabolic solutions are evolving to meet rapidly changing consumer behaviours and expectations.

Nutricosmetics will also be spotlighted on day three of the event, reflecting the growing focus on beauty-from-within. With sessions uncovering some of the key drivers in this area, expect to discover the innovation strategies, emerging ingredients, and functional foods shaping the fast-growing, global beauty-from-within market. With increasing understanding of how nutrition impacts skin health and more, Vitafoods Europe is the natural arena to explore the exciting intersection of wellness and beauty.

Other returning features include Innovation Tours, the New Product and Ingredient Zones, and the Tasting Centre, offering a curated view of the latest breakthroughs across the nutraceutical supply chain. Plus, an expanded Pet Nutrition Hub will showcase cutting-edge solutions for animal health, reflecting the growing demand for personalised, functional pet nutrition.

More ways to connect

With 30,000 visitors and 1,600 exhibitors expected to attend from over 135 countries, Vitafoods Europe is as much about who you meet as what you see. The 2026 event will offer a carefully curated programme of networking moments designed to spark meaningful connections across all sectors and regions within the nutraceutical industry. This year will see the return of popular networking formats such as the Future of Nutrition Lunch & Learn, Women's Networking Breakfast, and Coffee and Churros, as well as even more areas on the show floor dedicated to informal networking. Attendees can also make connections virtually via the online matchmaking tool. From structured sessions to relaxed, social moments on the show floor each networking opportunity is designed to spark conversation and collaboration.

The return of the Vitafoods Europe Innovation Awards

Celebrating excellence, ingenuity and progress, the Vitafoods Europe Innovation Awards return in 2026 to recognise the ideas and organisations driving meaningful progress across the nutraceutical sector. Spanning multiple areas across ingredients, finished products and innovation, the awards highlight breakthroughs that are making a real impact on health and wellbeing. Categories this year cover Sports Nutrition, Immune and Gut Health, Cognitive and Emotional Health, Healthy Ageing and more, with new categories announced for 2026, including Weight Management and Nutricosmetic Ingredients. Finalists will be showcased live at the event, with winners announced during an exclusive ceremony in Barcelona – providing an opportunity to come together and celebrate innovations that move nutraceuticals forward.

More space, more opportunity

A defining feature of Vitafoods Europe 2026 is the addition of a brand-new exhibition hall, delivering a 22% increase in show floor space. For attendees, this means more to explore – from a broader range of innovations to a more diverse mix of suppliers, solutions and expertise. For exhibitors, it creates more opportunity to connect and engage with high-quality leads and be part of a show that continues to grow alongside the market it serves.

Secure your pass for Vitafoods Europe 2026 : https://www.vitafoods.eu.com/en/registration.html.

Vitafoods Europe

5-7 May 2026, Fira Barcelona

More to explore

The world's nutraceutical event is bigger than ever

Vitafoods Europe returns for its biggest event to date. With an expanded show floor, there are more opportunities than ever to discover what's next in nutraceuticals.

- 30,000+ expected attendees
- Connect with thousands of global nutraceutical buyers, suppliers and experts
- Discover new products, innovations and insights
- More networking opportunities across the entire nutraceutical supply chain

Join us in Barcelona Book now