

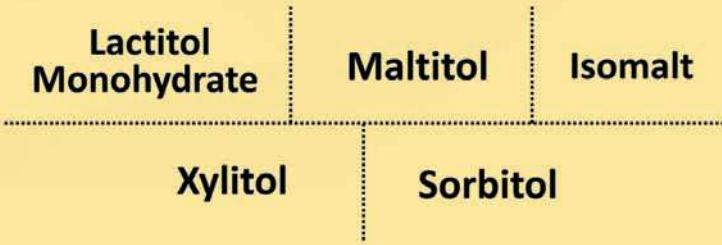
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Interview

Dr Debjani Roy
Executive Director,
SHEFEXIL

Shreyans Jain
Co-founder, Nutrabay

Dr Suresh Garg
Founder & CMD,
Zeon Lifesciences

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AUGUST - SEPTEMBER 2025. ₹50

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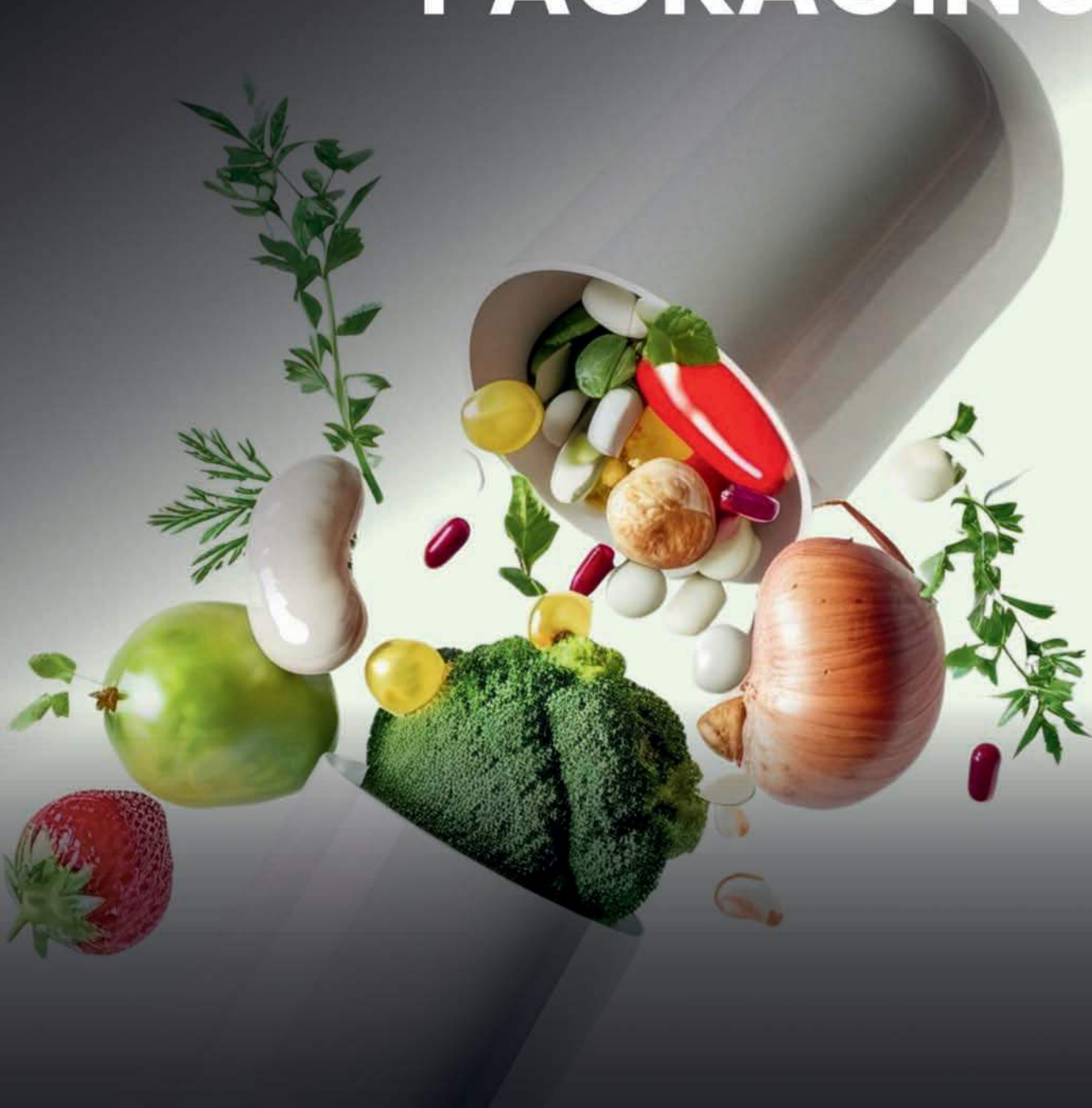
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UC Irvine scientists find natural compound combo that can clear Alzheimer's-linked brain proteins



Marrying the ancient with the modern



Companies in this space will need to back their claims with clinical evidence to satisfy regulators and consumers

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Recent launches in the nutrition category underline the role of technology in the next wave of nutraceuticals. Some of these products sound like science fiction. For instance, take “quantumtuned” herbal extracts. Shafiulla Hirehal Nuruddin, Managing Director of Greenspace Herbs and Project Quantum Ayurveda Ingredients is exploring how smartwatch data can power “quantumtuned” herbal extracts. In a guest blog for Express Nutra, he describes how these “ultratargeted formulations—each tuned not only to the botanical’s active constituents but to the user’s individual cellular landscape” as captured by smartphones and other wearables - will reduce pill burden by ‘transforming passive pills into dynamic, adaptive therapies precisely aligned with each user’s realtime physiology’. While companies in this space still need to back their claims with clinical evidence to satisfy regulators and consumers, the premise is intriguing. After nanotech has proven itself in the pharma sector; Sachin Darbarwar, Founder & CEO, ZeroHarm Sciences claims that nanotechnology is refining nutrient delivery, with nano-nutraceuticals marking a shift from generic solutions to intelligent, targeted supplementation that fits seamlessly into modern lifestyles.

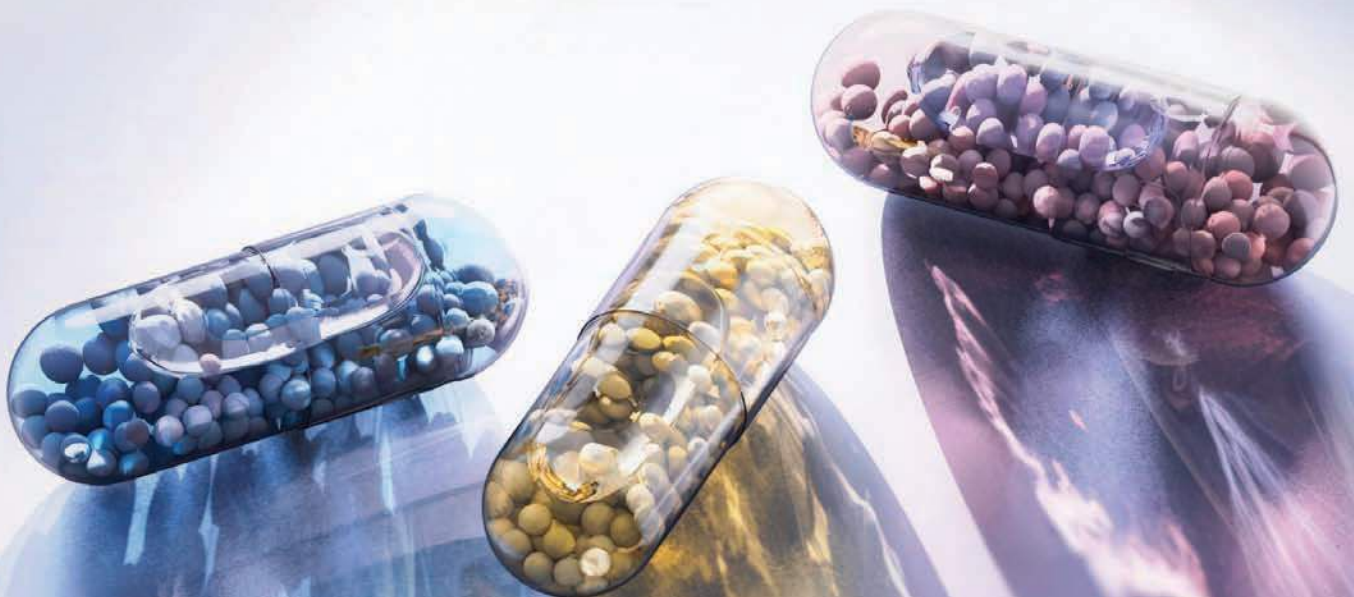
While start ups try out new ideas, big pharma companies are sprucing up their legacy brands. Torrent Pharma’s launch of Shelcal Total, extending the legacy brand into the adult nutrition supplement category is just one example. Shelcal Total offers a vegan solution in powder form, combining protein, essential vitamins, minerals, and functional nutrients to support bone, muscle and joint health, energy, immunity, gut health, brain health and skin health. The company already has gummies for the kids category. Both brand extensions seek to improve bioavailability of the product, in customer-friendly formats to ensure daily use.

Most innovations try to address the core pain points. On the clinical side, most naturally occurring nutraceuticals have poor bioavailability. Companies also struggle to make the final product slip seamlessly into the daily routines of the target consumers, be they hyperactive, taste-sensitive children or their busy parents. Companies are therefore tinkering with the formulation of known nutra supplements to solve these user pain points. As a bonus, they get to differentiate themselves in an increasingly crowded market. For instance, among the numerous gut health supplement brands, Happy Cultures from Velbiom Probiotics claims to contain ‘locally sourced probiotic solutions specifically formulated for the Indian gut and lifestyle’. Similarly, among the plethora of whey protein brands, Nutrabay claims that its latest launch, BioAbsorb, scores over others thanks to its ProDiFi blend — a patent-pending combination of probiotics, digestive enzymes, and dietary fiber — that presumably works together to optimise digestion, enhance nutrient uptake, and improve overall protein processing within the body.

According to a ResearchAndMarkets report, India’s nutritional supplements market size is anticipated to reach \$68.43 billion in 2030 and is expected to grow at a CAGR of 8.1 per cent from 2025 to 2030. Encouraged by the growth prospects, a few ingredient companies are eyeing the IPO route to fund capex expansion plans. Gujarat-based Sudeep Pharma, reportedly one of the largest producers of food-grade iron phosphate for infant nutrition, clinical nutrition, and the food and beverage sectors, filed its draft red herring prospectus (DRHP) with Securities and Exchange Board of India (SEBI) on June 24, 2025. As per the DRHP, the 35 year old company is the only company in India and one of nine companies globally with certification of suitability issued by the Council of Europe (CEP) and written confirmation certification for sale of calcium carbonate as an API in the EU as of December 31, 2024. As per media reports, in May 2025, the company acquired Nutrition Supplies Services (NSS), an Ireland-based micronutrient premix leader, which gives Sudeep direct entry into high-value segments like infant and clinical nutrition, while also enhancing its formulation expertise and regulatory presence in developed markets. Just two years after it was set up, Medistep Healthcare launched its IPO on August 8. With a portfolio spanning sanitary pads and energy powders, the company trades a diverse range of pharma products, nutra products, intimate products and surgical products through a vast distribution network. Whether these IPOs click or fade away, they represent the hope that India’s nutra segment commands. The upcoming Bharat Nutraverse, pegged as India’s first ever mega nutra trade expo at Bharat Mandapam, New Delhi in early September aims to play match maker between clients and solutions providers. As Media Partners to the show, we promise to share highlights and a detailed report in the next edition.

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Nutraceutical exports have shown a sharp upward trajectory post-COVID

Dr Debjani Roy, Executive Director, SHEFEXIL in an exclusive interaction with **Viveka Roychowdhury** dissects export trends in the nutraceutical segment, the challenges and opportunities of ongoing geopolitical shifts like bilateral FTAs, regional trade pacts, and tariff revisions by major markets like the US, and why the upcoming Bharat Nutraverse Expo 2025 will signal India's serious intent to lead the global wellness economy, rooted in science, sustainability, and Ayurveda-inspired innovation

Dr Roy, as Executive Director, SHEFEXIL, what is the mission of your organisation? SHEFEXIL (Shellac and Forest Products Export Promotion Council), under the Ministry of Commerce & Industry, Government of India, is mandated to promote exports of niche, nature-derived value-added products, including nutraceuticals and allied products, botanicals, plant-based ingredients and forest products like shellac, guar gum, and essential oils. As the designated Export Promotion Council for Nutraceuticals, our mission is to build global competitiveness, foster sustainable sourcing, support regulatory alignment, and create strategic platforms that connect Indian exporters with international markets.

What have been the cumulative export trends of your member companies, and category-wise, which are the segments showing an upward trajectory for the next few years?

Exports from SHEFEXIL's member base have shown steady growth, with cumulative exports crossing ₹9,000 crore annually across categories.

The nutraceutical segment, particularly plant-based extracts, dietary supplements, functional foods, probiotics, and adaptogens, has shown a sharp upward trajectory post-COVID. Guar gum (food-grade and emerging pharma-grade) also continues to be a significant contributor, while botanicals like ashwagandha, giloy, moringa, and curcumin are witnessing increasing global traction.

Segments such as FSMP/FSDU, fermented probiotics, and Ayurveda-inspired innovations are expected to accelerate further in the next 3–5 years.

What has been the impact of recent geopolitical moves like FTAs, tariffs, etc., on exports of your member companies?



Geopolitical shifts—including bilateral FTAs, regional trade pacts, and more recently, tariff revisions by major markets like the US—are exerting both challenges and opportunities.

While FTAs with the UAE, Australia, and ASEAN have helped reduce tariff barriers and improve access, the proposed increase in US tariffs on certain Indian products (if not addressed by August 2025) may impact our competitiveness in select segments. We are in continuous dialogue with the Department of Commerce to ensure our sectors are protected and new growth corridors are pursued strategically.

How are these companies part of the nutraceutical ecosystem in India and globally?

Many of SHEFEXIL's member companies are leading players in the global wellness supply chain — supplying herbal extracts, functional ingredients, fermentation inputs, and finished nutraceuticals to global brands.

Domestically, they form the foundation of India's evidence-based nutraceutical ecosystem, aligned with Ayush, food safety, and international quality norms. They contribute

not just as exporters, but as R&D partners, contract manufacturers, and knowledge creators, deeply embedded in the evolving India-for-Global Health narrative.

Any policy suggestions from SHEFEXIL?

Yes. Some key policy suggestions we have advocated for include:

- Rationalisation of regulatory frameworks between FSSAI, CDSCO, and Ayush for clarity on product classification
- Dedicated R&D and export incentive schemes for nutraceuticals, especially under RoDTEP
- Support for harmonisation with global standards, particularly in labelling and safety dossiers
- Fast-track IP and innovation pathways for nutraceutical patents and clinical validation
- Inclusion of nutraceuticals in trade negotiations with strategic markets

Why is the upcoming Bharat Nutraverse Expo 2025 crucial to India's nutraceutical ecosystem?

The Bharat Nutraverse Expo 2025, organised by SHEFEXIL under the aegis of the Ministry of Commerce & Industry, is India's first Government-led platform exclusively dedicated to the nutraceutical sector.

It brings together industry, global buyers, regulators, research institutions, and startups on one stage to shape a cohesive roadmap for India's projected \$100 billion nutraceutical economy by 2047.

This Expo is not just an exhibition—it is a strategic convening point to signal India's serious intent to lead the global wellness economy, rooted in science, sustainability, and Ayurveda-inspired innovation.

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The patented blend, ProDiFi, aims to provide better digestion and absorption

Shreyans Jain, Co-founder, Nutrabay, explains how BioAbsorb's protein blend addresses the poor absorption and digestive discomfort in an interview with **Express Nutra**

Can the company give more details on the formulation research that resulted in BioAbsorb?

The development of Nutrabay BioAbsorb was a rigorous and dedicated process spanning 1.5-2 years of intensive research and development, culminating in one year dedicated explicitly to comprehensive stability testing of the final ProDiFi blend. Our journey began by deeply understanding the core challenges faced by protein consumers: the widespread issues of poor absorption and digestive discomfort, such as bloating and gas.

Our formulation team, alongside leading experts, conducted extensive research into the individual and synergistic effects of various ingredients. This involved:

● **Identifying optimal probiotic strains:** We meticulously selected 11 diverse strains (*B. lactis*, *B. bifidum*, *B. breve*, *B. longum*, *L. acidophilus*, *L. rhamnosus*, *L. reuteri*, *L. plantarum*, *L. casei*, *L. brevis*, *L. gasseri*) known for their roles in gut health, protein metabolism, and digestive comfort.

● **Selecting the ideal prebiotic fiber:** We chose Fructo-oligosaccharides (FOS) due to their superior fermentability by beneficial gut bacteria, its excellent tolerance profile, and their proven ability to nourish the specific probiotic strains we selected.

● **Developing a comprehensive digestive enzyme blend:** We included a full spectrum of five key enzymes (Amylase, Protease, Lactase, Lipase, Cellulase) to ensure the efficient breakdown of all macronutrients, with a strong focus on Protease for protein and Lactase for common whey-related lactose issues.

The goal was to move beyond simply adding individual components. We aimed to create a patented blend, ProDiFi, where these three components work in true symphony for digestion and absorption. The stability testing was critical to ensure that the live probiotics remained viable and the enzymes retained their activity throughout the product's shelf life, guaranteeing consistent efficacy for the consumer. This meticulous research ensures



BioAbsorb is not just another protein, but a scientifically formulated solution for superior protein utilisation.

How does BioAbsorb's ProDiFi blend address the poor absorption and digestive discomfort faced by most protein consumers?

ProDiFi blend provides a comprehensive, multi-pronged solution to the common issues of poor absorption and digestive discomfort:

For poor absorption (enhancing bioavailability):

● **Direct protein breakdown (digestive enzymes – protease):** Our Protease enzyme directly breaks down whey protein into smaller, more easily absorbable peptides and amino acids. This 'pre-digestion' means your body burns less energy breaking down the protein, making more of it readily available for absorption.

● **Optimised absorption pathway (probiotics and prebiotic FOS):** The diverse probiotic strains, nourished by FOS, fortify the intestinal barrier, often referred to as the gut lining. A healthy, intact gut barrier is crucial for efficient and selective absorption of nutrients into the bloodstream. It ensures that the amino acids, once liberated, can pass through smoothly, maximising the amount of protein that truly becomes 'bioavailable' to your body.

● **Reduced undigested residues:** By ensuring

that no food remains undigested in the stomach, ProDiFi minimises the fermentation of undigested food in the large intestine and prevents indigestion issues.

For digestive discomfort (bloating, gas, etc.):

● **Lactose digestion (lactase enzyme):** A major culprit for bloating and gas from whey protein is lactose intolerance. Our Lactase enzyme effectively breaks down lactose, preventing the discomfort it causes and making BioAbsorb digestible even for those sensitive to dairy.

● **Balanced gut microbiome (Probiotics & FOS):** An imbalanced gut can lead to excessive gas production and inflammation. Our 11-strain probiotic blend, supported by the prebiotic FOS, helps to restore and maintain a healthy gut flora. This reduces the population of gas-producing bacteria, minimises harmful fermentation, and supports overall gut motility, leading to a significant reduction in bloating, gas, and stomach upset.

● **Efficient overall digestion:** The full spectrum of digestive enzymes (Amylase, Lipase, Cellulase, in addition to Protease and Lactase) ensures efficient breakdown of all macronutrients, reducing the burden on your digestive system and leading to a lighter, more comfortable feeling after consumption.

What does the pending patent on the ProDiFi blend cover?

The pending patent on our ProDiFi blend covers the unique and synergistic combination of specific probiotic strains, the chosen dietary fiber (Fructo-oligosaccharides), and our comprehensive digestive enzyme blend, and how these components interact to deliver enhanced protein digestion, absorption, and overall gut health.

This patent protects our proprietary formulation, ensuring that this precise combination and the resulting functional benefits are unique to Nutrabay BioAbsorb Whey. It underscores our commitment to innovation and provides a significant competitive advantage, differentiating BioAbsorb as a novel and scientifically-backed solution in the market. The patent



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specifically focuses on the inventive aspect of combining these three distinct categories of ingredients to achieve the stated outcome of superior protein bioavailability and digestive comfort.

Is there any published research from the company on the clinical trials and stability tests backing this product? Or other global products of this nature which claim to give this benefit?

We understand the importance of scientific validation, and it's a core pillar of Nutrabay.

“Numerous studies have shown that”

- The addition of proteases can significantly increase amino acid and peptide uptake from protein supplements.
- Specific probiotic strains (many of which are in ProDiFi) can enhance gut barrier function, improve the digestion of proteins, and reduce gastrointestinal symptoms like bloating and gas.
- Prebiotics like FOS selectively stimulate beneficial gut bacteria, leading to an improved gut environment that supports overall digestion and nutrient absorption.

Here are a few reference studies. However, the clinical trials on Nutrabay BioAbsorb Whey have already started, and we will be sharing the results soon.

1. Study of amino acids absorption and the gut microbiome on the consumption of pea protein blended with enzymes-probiotics supplement – PubMed
2. Digestive enzymes reduce quality differences between plant and animal proteins: a double-blind crossover study – Journal of the International Society of Sports Nutrition
3. Dietary fructooligosaccharides affect intestinal barrier function in healthy men – PubMed
4. Enzyme blend may lead to quicker amino acid uptake from whey post-exercise: Study
5. Frontiers | Study of amino acids absorption and gut microbiome on the consumption of pea protein blended with enzymes-probiotics supplement

How does the company prove that the new product addresses the problems of poor absorption and digestive discomfort with existing products? (In a clinical trial of a new drug, this would translate to outcomes of longer survival, and recovery from symptoms so what would be the similar outcomes from this product?)

We completely agree that proving efficacy

through tangible outcomes is paramount, just as it is in pharmaceutical trials. While Nutrabay BioAbsorb is a dietary supplement, our commitment to scientific validation mirrors the rigour of clinical research.

Currently, we are in the process of human clinical trials specifically designed to scientifically validate the enhanced benefits of BioAbsorb Whey with our ProDiFi blend. These trials will focus on objective, measurable parameters to demonstrate improved absorption and reduced digestive discomfort:

For enhanced absorption (Increased protein bioavailability):

- We will be monitoring various blood parameters, most critically, plasma amino acid levels. After subjects consume BioAbsorb Whey, we will track the rate at which amino acids appear in the bloodstream, the peak concentration they reach, and the duration for which they remain elevated. This will be directly compared to a control group consuming a standard whey protein without ProDiFi. A higher and more rapid appearance of amino acids in the blood will be a clear indication of superior digestion and absorption, meaning more of the protein you consume is becoming available to your body.
- We may also investigate other markers like nitrogen balance, which indicates how much protein is being retained and utilised versus excreted.

For reduced digestive discomfort:

- We will employ validated questionnaires and symptom diaries, where participants will report on their experiences with common digestive issues, such as bloating, gas, abdominal pain, and overall comfort levels after consuming the product. These subjective reports will be meticulously collected and analysed to provide a quantitative measure of symptom reduction.

Our goal with these trials is to provide robust, data-driven evidence that BioAbsorb Whey indeed offers significantly better protein absorption and a more comfortable digestive experience compared to conventional whey proteins. We are dedicated to sharing these findings transparently once the trials are completed, providing our consumers and the scientific community with the confidence that BioAbsorb is truly a next-generation protein solution.

What has been the response to the launch from dietitians and nutritionists?

The initial response from dietitians and nutri-

tionists has been overwhelmingly positive and enthusiastic. This is largely because BioAbsorb directly addresses some of their most common challenges when recommending protein supplements to clients:

● **Addressing client compliance:** Many dietitians report that their clients struggle with the digestive side effects of traditional protein powders, which can lead to them discontinuing use. They see BioAbsorb as a game-changer for improving client compliance and adherence to their nutritional plans.

● **Focus on absorption, not just intake:** Nutrition professionals understand that consuming protein is only half the battle; absorption is key. They appreciate our emphasis on enhancing protein bioavailability, which aligns perfectly with their goal of ensuring optimal nutrient utilisation for their clients' health and performance goals.

● **Holistic gut health approach:** The inclusion of prebiotics and a diverse probiotic blend resonates strongly with dietitians who advocate for comprehensive gut health as foundational to overall well-being. They recognise that a healthy gut microbiome supports not just digestion, but also immunity, mood, and nutrient synergy.

● **Science-backed ingredients:** Our transparent and science-backed approach to ingredient selection, emphasising clinically studied components, gives them confidence in recommending BioAbsorb to their clients.

Many have expressed excitement about finally having a protein supplement they can confidently recommend to clients who are sensitive to traditional proteins or who are looking for a more advanced digestive support solution. We are actively engaging with the professional community to share our research and gather further feedback, solidifying BioAbsorb's position as a preferred choice among experts.

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Nutra CDMOs help convert ideas into successful business products

Dr Suresh Garg, Founder & CMD, Zeon Lifesciences speaks to **Viveka Roychowdhury** on the evolution and crucial role played by nutra CDMOs to scale up innovation, help startup and MSME nutra players to strategically scale up faster and navigate the increasingly complex world of customised nutra formulations

What is the market size of the global and Indian nutra CDMO market, and what is Zeon Life Science's share in this market?

The global market was around \$37.3 billion in 2022, and is projected to reach \$67.8 billion by 2030 at a CAGR of 7.7-8 per cent. The Indian CDMO market (including pharma, nutra, and related sectors) stood at \$22.1 billion in 2024, forecasted to hit \$54.7 billion by 2031 at a CAGR of 13.8 per cent. Specific data on India's nutra segment is limited, but the segment is expanding rapidly.

At Zeon Lifesciences, we are proud to be recognised as one of India's leading contract manufacturers in the nutraceutical space. While our exact market share is not publicly disclosed, we are privileged to be the preferred partner for numerous leading companies in India and across the globe, who trust us for our quality, innovation, and end-to-end solutions.

How has the role of CDMOs evolved in the nutraceuticals space?

Historically, CDMOs provided basic manufacturing. A CDMO's role is now much more vast and pivotal. There are multiple reasons behind this.

Firstly, pharma companies are looking towards nutraceutical companies because there is a lot of scope in nutraceuticals, and COVID has played a vital role in increasing nutraceutical awareness. The whole pharma industry now wants to enter the nutraceutical market.

As they do not want to spend capex to establish a new facility, they want to use the expertise of CDMOs, which provide all facilities - R&D, regulatory support, clinical validation, formulation, innovation, packaging, quality assurance, and quality control - required for testing ingredients, raw materials, etc.

Secondly, CDMOs have complete setups for the supply chain of raw materials and packaging materials and possess deep expertise in the products. Pharma and nutra fa-



ilities are different, requiring significant knowledge and expertise to set up a new factory altogether. With CDMOs, they get the same product at a competitive cost.

This is why they are approaching CDMOs, and why India is becoming a global leader. India's large population, strong nutraceutical manufacturing capabilities, cost advantages, and supportive policies are attracting more global companies to invest and expand here, making it a key hub for healthcare and nutraceutical growth.

As you said, pharma companies are getting into the nutra segment, and they want a fast-start into nutra. Also, there is a regulation that you cannot manufacture nutraceuticals in the same plant as pharmaceuticals. Is that also one of the reasons why this whole trend of outsourcing nutra to CDMOs started?

Yes, that is one of the factors, because there are many regulatory differences between nutra and pharma. Nutra is altogether different from pharma, and they cannot be manufactured in the same plant.

Currently, under the revised Schedule M of the Drugs and Cosmetics Act in India, manufacturing of nutraceuticals and pharmaceuticals in the same facility is generally not al-

lowed unless strict segregation and dedicated areas are maintained. While pharma is prescriptive and involves treatment, nutra is a preventive form of healthcare taken beforehand so that you don't fall sick.

The nutraceutical sector has evolved into a big business post-COVID, and we see many startups trying to create space for themselves in this sector.

What about the new startups in the nutra space? Do you handhold them or help them? Do startups also constitute some part of your client base?

Yes, many startups are entering the nutraceutical sector, as these are daily-use products. For instance, everyone wants to enter the sports nutrition market.

Besides, startups are coming up with new ideas beyond existing dosage forms. Capsules, tablets, powders, and liquids have transitioned into mouth sprays, effervescent, gummies, soft gels, oil-filled capsules, etc., so you can easily have them while travelling, or enjoy enhanced taste and make it more lifestyle-integrated rather than like a medicine.

Whether it is new startups or the existing industry, which already has a base in nutraceuticals, CDMOs, with their expertise, facilities, and knowledge, convert their ideas into successful business products.

One of the challenges that SME nutraceutical enterprises face is that they may not have the management or scientific bandwidth or even the kind of funds/resources. Hence they approach bigger CDMOs to get clinical validation of their ideas/products. Are CDMOs helping to add scientific expertise and clinical validation to the ideas that a fresh startup nutraceutical company might bring?

In general, the mindset has totally changed. Now people want everything they eat to be scientifically formulated. Without that, the new generation doesn't believe in anything.

Talking about another factor - clinical tests - there are many ingredients being launched these days that are scientifically and clinically approved. On the clinical front, the product is manufactured because the ingredients have already undergone various clinical tests.

Besides that, there are a lot of tests going on with various ingredients and finished formulations. However, clinical trials are quite expensive, requiring huge investment and government support. It is a time-consuming process, as one has to perform trials in various zones.

How have CDMOs helped in cutting the time from concept to market?

Any new product used to take 3-4 years to formulate, but now, with the support of CDMOs and the advancements we've had over the years, it can be done within 3-6 months.

CDMOs have proper setups for R&D and various types of tests. They also have pilot plants to do various trials - usually all facilities in one place or through tie-ups with institutions - which certainly reduces a lot of time.

As far as startups are concerned, they may have limited funding and knowledge related to the product. Although their ideas are excellent, they can be discussed with CDMOs and commercialised, thus playing a pivotal role.

Can you give some examples which are already in the public domain?

As a CDMO, we have many products in the medical nutrition range - renal, onco, diabetic, pregnancy, lactating mothers, dialysis patients, general nutrition, sports, etc.

We have a whole setup for different nutraceutical products by dry blending, spray drying, liquids, tablets, and capsules. Now we are adding pet nutrition, probiotics, and specialised medical nutrition. You just need to turn the box to the backside and find "manufactured by Zeon Lifesciences."

When you say you are doing your own product, are you talking about products that are branded by your company, or are you talking of the products by your clients as a CDMO?

As a CDMO, we manufacture other brands. We don't have our own range of branded products as of today. All our client companies agree in writing that their products are manufactured by Zeon Lifesciences.

How are nutra CDMOs helping the client to navigate the complex volatility that is seen in geopolitics and supply chain disruptions, as you have an international market base as well? Are all your products sourced within India, or are you dependent on supply chains for the products' ingredients to come from outside India?

Most raw materials, due to reasonable cost, were earlier purchased from China, but now India's mindset has totally changed to "Make in India, Made in India and Export."

We are now thinking along those lines and buying ingredients from other countries where it is reasonable. All big companies are now thinking about how we can get everything manufactured within India without being dependent on other countries.

Because of this demand, the whole industry is now seeing the huge scope within India. Not only that, India's capabilities have increased and developed over the past few years.

Many ingredients are not available in large quantities in India. How do you manage the sustainable sourcing of these ingredients, especially when it comes to Ayurvedic ingredients that are used as a base in nutraceuticals? What are the challenges and opportunities as a CDMO manufacturer?

Earlier, the industry did not have much idea about India's medicinal potential. There is more awareness now. Earlier there were no extraction plants, but now many extraction plants have already come up in India, which manufacture different kinds of herb extracts. New technological changes are also taking place, which increase the yield capacity. India is extracting many herbs and exporting them to the world. This is also increasing the influence of Ayurveda worldwide.

When you consider the extraction of ingredients from their natural form, improving extraction yields and purity is directly proportional to profitability. What kind of technologies does Zeon Lifesciences deploy in this space to differentiate itself from the market?

We are still working on having a supercritical CO2 extraction plant, which is the most advanced plant for extraction purposes, and the yield is also higher. The challenge is managing the variability and supply of raw mate-

rials. To fully leverage the advantages of this advanced extraction process, it is crucial to ensure that the feedstock is of high quality, sustainably sourced, and consistent. This alignment between raw material characteristics and the specific parameters of supercritical extraction technology is essential for optimal performance and delivering superior products to our clients.

What are the regulatory challenges that a nutraceutical CDMO faces?

There are multiple challenges. First, the challenge is regarding the specifications used in the products. International products have different Recommended Dietary Allowances (RDA) than the Food Safety and Standards Authority of India (FSSAI). So sometimes the products coming via imports become a challenge for us.

We have requested the government and the regulatory authority to ensure that products imported at par with the FSSAI-allowed RDA should be increased.

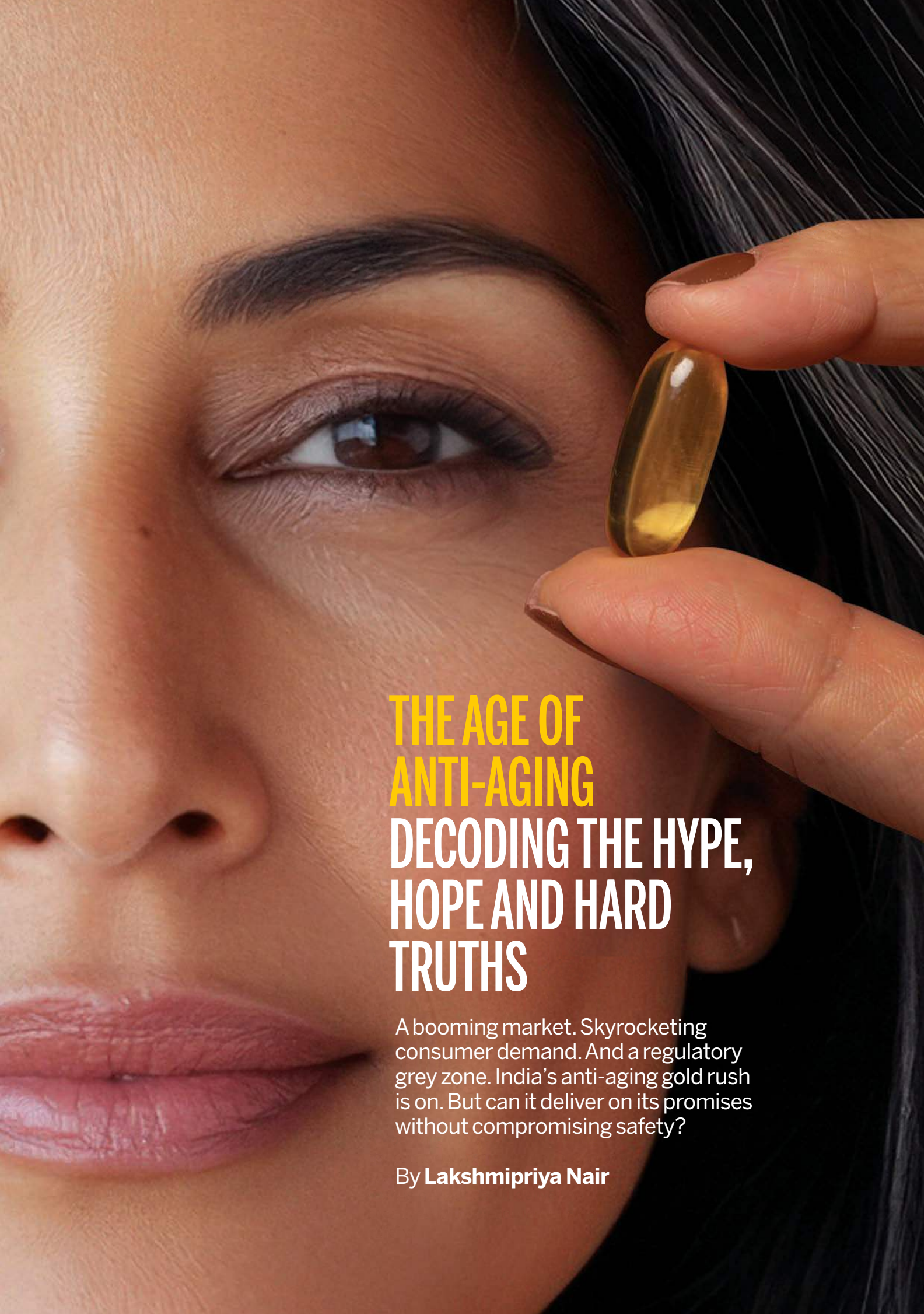
We are also facing problems when it comes to exports because most of the products we manufacture here have to comply with different regulations abroad.

Which segments of the nutraceutical market do you see faster growth in the coming years?

Earlier, sports nutrition was growing the most, but now the mindset is moving towards specialised nutrition because of increased awareness. Earlier, people were concerned about incorporating more protein in their diets, but now we also see awareness towards other nutritional elements, particularly for women's and children's health. We've also seen a rise in demand for gut health and pet care supplements.

The global market for nutraceuticals is increasing very fast, and this will increase beyond \$657-919 billion by 2030. In India, the nutraceutical market is growing rapidly with a CAGR of about 20 per cent, expected to reach around \$50 billion by 2031, playing an increasingly important role in the global nutraceutical landscape. If there is better support from the government, and these challenges are addressed, we can grow at a more rapid pace.

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THE AGE OF ANTI-AGING DECODING THE HYPE, HOPE AND HARD TRUTHS

A booming market. Skyrocketing consumer demand. And a regulatory grey zone. India's anti-aging gold rush is on. But can it deliver on its promises without compromising safety?

By **Lakshmipriya Nair**

The pursuit of beauty and youth is nothing new. Humanity has been obsessed with defying age since the beginning of time. Legends like the Fountain of Youth and the alchemists' elixirs, beauty practices of the famed Egyptian-queen Cleopatra and the longevity routines of tech entrepreneur Bryan Johnson, are cases in point. However, in the modern day, this quest has evolved into a multi-billion dollar industry, a marketable promise spanning medicine, cosmetics and lifestyle interventions.

But, the recent death of Shefali Jariwala, an Indian actress and model in her early 40s, has brought this industry under the spotlight for the wrong reasons. Reports suggest she had been regularly taking multiple anti-ageing supplements. While it's unclear if her supplement use was linked to her cardiac arrest, the tragedy has highlighted the risks of India's fast-growing but loosely regulated anti-ageing supplement market.

In search of gold...

And, it needs further scrutiny because we are no longer looking at a niche trend. Across urban India, even people in their 20s and 30s are turning to anti-ageing supplements. Once used by a few, these products are now mainstream, thanks to advertisements, social media, influencer outreach and upscale wellness clinics.

Biplab Lenin, Partner, Cyril Amarchand Mangaldas, points out, "Humans have always wanted to live longer and live better. People want to look young and they have the disposable income to spend in order to look young."

A report by Grandview research confirms, "The India anti-ageing supplements market generated a revenue of \$214.3 million in 2023 and is expected to reach \$400.7 million by 2030. The India market is expected to grow at a CAGR of 9.3 per cent from 2024 to 2030."

So, the market opportunity is clear and unmistakable. And, startups, pharma majors and global investors are betting big on the world's quest for eternal youth. Much like the prospectors of the 19th-century Gold Rush. Today, the 'gold' is the market share in a rapidly growing segment, and the new frontier is India's fast-growing, image-conscious middle class.

But this isn't just about vanity and beauty. A deeper shift is underway. It is about how longer healthy lifespans are



"With the regulations not being very stringent, some market players might even want to take benefit of the first-mover advantage as long as the regulatory grey area persists. With all these parameters, anti-ageing and longevity are definitely compelling investment opportunities for the market"

BIPLAB LENIN
Partner,
Cyril Amarchand Mangaldas



"Exports of nutraceuticals from India are encouraging because we offer quality products. We also have a cost advantage, which is a key driver for export growth in the global market"

DR RK SANGHAVI
Chairperson, Nutraceutical
Committee, IDMA



"High doses of vitamin E or NAD can impair cardiac function, and IV drips with magnesium, potassium, or calcium can trigger dangerous heart rhythm disturbances. These are promoted as 'quick fixes' which cause no harm. This belief is dangerous"

DR DEVAYANI BARVE
Plastic Surgeon,
Mumbai



"What we need is an intelligent overhaul of the existing regulatory frameworks, streamlined, risk-based and responsive to innovation. The current laws should be amended to reflect emerging market realities. Reforms must be grounded in global best practices- adopted thoughtfully, keeping India's developmental context in mind"

RISHI AGARWAL
CEO and Co-founder,
Teamlease Regtech

reshaping how people live, work, and spend.

We are seeing a spate of investments in the longevity economy, globally and in India. For instance, in June 2025, Biopeak, a health and longevity startup, raised \$3 million in seed funding from Claypond Capital (Ranjan Pai's family office), Accel's Prashanth Prakash, and Rainmatter. It focuses on using AI and biology to improve long-term health.

Anti-ageing is a big part of this trend, and Biopeak is just one example. To understand the market and optimise the potential, we need to look at the bigger forces driving it.

As Dr RK Sanghavi, Chairperson, Nutraceutical Committee, Indian Drug Manufacturers' Association (IDMA) explains, "Medically, anti-ageing can be looked at in two ways. One is to address problems associated with the aging process, whether physically or cosmetically. The second, which is more medically relevant, is to stay healthy and live longer in good health."

He adds, "Prevention of the risk of disease is going to play a more important role (in times to come) compared to the treatment of diseases. So, this market is not a fad, it is here to stay for the long term".

The numbers back Dr Sanghavi's views. A report by IMARC Group informs, "In India, the broader health and wellness market reached \$156 billion in 2024 and is projected to grow to \$256.9 billion by 2033, expanding at a CAGR of 5.3 per cent."

Thus, the promise of anti-ageing is powerful.

But, all that glitters....

However, often big opportunity comes with hidden peril. Like the Trojan Horse that looked like a gift but hid soldiers inside, gloss could be hiding dross, and sometimes danger.

History also offers enough parallels. In every gold rush, a few got rich while most went home empty handed. For instance, take the dot-com crash. Or the housing bubble burst. Huge promises, weak oversight and funds pouring in too fast.

Today's anti-ageing boom carries the same warning signs, a similar pattern. Experts caution that unless backed by adequate regulation, scientific validation and consumer education, breakthrough will become backlash.

"The Indian masses are increasingly jumping onto the 'anti-ageing bandwagon' and the manner in which such anti-ageing supplements or procedures are being delivered seems to work in a regulatory grey zone. Procedures which should be done only by doctors are being undertaken at shady spas and salons, the nuisance of self-medication when it comes to health-supplements is also increasing. The masses are usually ill-informed as any anything cosmetic-related is not considered by the lay man as medical in nature, therefore, people are willing to take glow drips wherever these are available at a cheap rate, and are popping pills left, right, and centre," highlights Lenin.

"With the regulations not being very stringent, some market players might even want to take benefit of the first-mover advantage as long as the regulatory grey area persists. With all these parameters, anti-ageing and longevity are definitely compelling investment opportunities for the market."

Mumbai-based plastic surgeon Dr Devayani Barve reiterates this view and cautions that "high doses of vitamin E or NAD can impair cardiac function, and IV drips with magnesium, potassium, or calcium can trigger dangerous heart rhythm disturbances. These are promoted as 'quick fixes' which cause no harm. This belief is dangerous."

From an investor's lens, these issues are not just red flags that could impair public health, but a Pandora's Box that could cause serious harm to reputation and invite severe backlash.

And, these risks bring us to the crux of the whole matter: regulation.

The shades of grey: Inside India's regulatory maze

Regulations will be the key to turning this fast-moving market into a sustainable, credible industry. A clear, streamlined framework, will be the decisive factor between boom and bust, opportunity and crisis. But, the current regulatory scenario is a maze of overlapping rules and agencies.

Rishi Agarwal, CEO and Co-founder of Teamlease Regtech, gives a detailed overview of the existing regulations, "India regulates nutraceuticals and dietary supplements under the Food Safety and Standards Act, 2006, with specific rules framed by the

Food Safety and Standards Authority of India (FSSAI)."

He informs that the key regulations applicable to this space include:

1. Food Safety and Standards (Health Supplements, Nutraceuticals, Food for Special Dietary Use, Food for Special Medical Purpose, Functional Foods and Novel Foods) Regulations, 2016 (known as Nutraceutical Regulations)

2. Labelling and health claims are governed by two separate regulations:

- a. Labelling and Display Regulations, 2020

- b. Advertising and Claims Regulations, 2018

Agarwal explains that every manufacturer must obtain a valid FSSAI license to market nutra products. If the product uses only pre-approved ingredients in permissible quantities, it does not need separate product approval. However, for novel ingredients or higher-than-permitted dosages, FSSAI conducts scientific risk assessments before granting product-specific approval.

He adds that FSSAI mandates nutrient content not exceed the Recommended Dietary Allowance (RDA) set by the Indian Council of Medical Research (ICMR). Where Indian RDAs are unavailable, Codex Alimentarius or internationally accepted references are consulted, though final approval still rests with FSSAI.

Labels must transparently declare ingredients, usage instructions, and warnings (such as 'NOT FOR MEDICINAL USE') and clearly identify the intended consumer group. Therapeutic, disease-curing, or drug-like claims are prohibited. Only structure-function and general wellness claims supported by scientific evidence are allowed. In June 2025, FSSAI explicitly banned '100 per cent' claims (for instance, 100 per cent cure, 100 per cent safe) to address rampant consumer misinformation.

The ingredients used must also conform to purity standards specified in official gazettes, the Indian Pharmacopoeia (IP), or globally accepted compendia. If not specified, manufacturers must declare the criteria adopted.

Agarwal cautions, "While India's regulatory framework is relatively robust on paper, implementation gaps persist, particularly in monitoring advertising practices and post-market surveillance. Recognising this,

GROWTH POTENTIAL VS PITFALLS

Opportunities	Risks
Massive market potential	Health safety concerns
Demographic dividend: ageing population doubling	Regulatory uncertainty across multiple agencies
Export advantages and cost benefits	Consumer misinformation and false claims
Rising disposable income	Quality control gaps and contamination issues
First-mover advantages in regulatory grey areas	Reputation and legal risks
Healthcare shift toward prevention	Unqualified practitioners performing medical procedures

an inter-ministerial committee in 2024 proposed shifting the regulation of certain high-risk categories—such as vitamins, minerals, and amino acids in therapeutic dosage forms—to the Central Drugs Standard Control Organisation (CDSCO). Under the proposal, FSSAI would continue to oversee food-grade applications, while CDSCO would regulate products bordering on therapeutics, especially those making disease risk-reduction (DRR) claims.”

Other experts also underscore the fragmented nature of the current framework and advocate for streamlining it.

Lenin states, “With the longevity and bio-hacking industry gaining traction, having a separate regulatory framework for the same might help, especially for streamlining the regulatory regime which is at present quite fragmented and spread across various legislations and departments like the CDSCO, FSSAI, AYUSH, etc. While these regulations independently do provide for detailed frameworks of scrutiny, the challenge is that with a melange of regulations, it becomes easy to escape from the loose ends. Therefore, a clear framework for the manner of scientific substantiation, marketing, tiered risk-based scrutiny across supplements and IV drips, etc., training of professionals undertaking beauty procedures, availability of products over the counter, etc., would be ideal.”

Dr Sanghvi highlights critical gaps, “Nutraceuticals are not included in the medical curriculum. FSSAI also has significant gaps in

understanding nutraceuticals, which makes it very difficult to provide proper guidance. Regulations should be aligned with global standards. For example, Codex Alimentarius is a global regulatory framework. India is a member, but we have not fully synchronised our regulations with Codex.”

Cutting through the Gordian Knot

Greek legends mentions the Gordian knot. It was so complex that no one could untie it. Alexander the Great cut through the knot with a single stroke of his sword. Nutra regulations are similar. Complex, overlapping, and difficult to untangle. The only way forward is to cut through the mess with clarity, vision and smart reforms.

Industry experts also recommend that balanced regulation is the need of the hour. The challenge is to create a framework that adapts to different levels of risk and innovation.

Lenin opines, “While it would not be prudent to regulate the same as strictly as drugs, it is also not ideal to keep the regulatory framework lingering with loose ends,” he adds.

“It is important to understand that if such a regulation does come into effect, it should not stifle innovation and should cater to the various categories of longevity and bio-hacking industry – for instance, while moderate oversight would work for supplements and nutraceuticals, strict protocols should be provided for beauty-medical procedures. One

formula for all would not be ideal,” he advises further.

Agrawal stresses on the importance of smarter compliance frameworks, and says, “India does not need more regulations; it needs better ones. The first step is regulatory clarity. Distinguishing between general health supplements (under FSSAI) and therapeutic or high-risk products (under CDSCO) is essential to apply the right degree of scrutiny. Without this segmentation, innovators are left navigating ambiguity that delays both development and access.”

He adds, “What we need is an intelligent overhaul of the existing regulatory frameworks, streamlined, risk-based and responsive to innovation. The current laws should be amended to reflect emerging market realities. Reforms must be grounded in global best practices- adopted thoughtfully, keeping India’s developmental context in mind. Many developed nations are actively rethinking how to regulate the intersection of health, tech and wellness. India must do the same but through recalibration and not redundancy.”

According to him, a risk-based classification system for ingredients is key. “Products made with safe, well-established, or naturally occurring ingredients should undergo faster approval cycles, while those involving novel, high-risk, or allergy-prone components should face stricter evaluation and longer approval timelines. Ingredients known to have potentially lethal side effects

or aggravate serious medical conditions should face prohibition or enhanced regulatory screening.”

He outlines, “Most importantly, the compliance burden must be natively digital. Approvals, registrations and filings should be intuitive, tech-enabled and built for scale. Compliance should not be a bottleneck to progress, it should be a seamless part of doing business.”

Dr Sanghvi stresses the need for stronger industry self-regulation, “Voluntary quality marks, third-party validations, and honest consumer education should become the norm. If we don’t self-regulate, we will face over-regulation.”

At the crossroads

Despite the risks, we are witnessing a lot of funds pouring in. Why? Because the potential is immense. And, this race isn’t limited to supplements alone. India’s nutraceuticals market, that includes functional foods and

herbal extracts too, reached “\$8.78 billion in 2024 and is expected to reach \$23.51 billion by 2032, growing at a CAGR of 13.10 per cent from 2025 to 2032,” according to ASD Reports.

This growth is driven not just by consumer demand but also by demographics. India had an elderly population of 153 million (aged 60+) in 2023, set to more than double by 2050, according to the United Nations Population Fund (UNFPA). Rising rates of diabetes and cardiovascular risks also propel the demand for preventive healthcare.


Thus, for India, the opportunity is twofold: a large domestic market and global export potential. Companies or brands that achieve a breakthrough first will get to define how the segment works and is perceived. Dr Sanghvi highlights, “Exports of nutraceuticals from India are encouraging because we offer quality products. We also have a cost advantage, which is a key driver for export growth in the global market.”

These perspectives from experts and analysts highlight that the India’s anti-ageing industry is at crossroads. Will it continue as a high-growth but high-risk sector, or evolve into a trusted, competitive choice for longevity science? The answer lies in how businesses, regulators and stakeholders choose to act today.

A promise and a puzzle

India’s anti-ageing boom is at an inflection point. It marked by big bets and disruptive promise. The players who treat this as a long game, invest in research, prioritise quality, build science-backed products, ensure regulatory compliance and win consumer trust, will be the ones who endure. In the end, those who invest boldly, but with discipline, credibility and foresight will emerge winners in this race.

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India-UK FTA can propel Indian nutraceuticals onto the global stage

Sanjaya Mariwala, Executive Chairman and MD, OmniActive Health Technologies, outlines how the India–UK FTA presents a strategic opportunity for India's nutra sector to scale, provided it is supported by policy alignment, scientific investment, and global positioning

The India-UK Free Trade Agreement may not name nutraceuticals directly, but its wider push on healthcare trade and regulatory ease opens a timely opportunity for one of India's fast-growing sectors to scale globally.

India is not new to preventive health. The country draws reference from millennia-old traditions of Ayurveda, supported by a vast base of over 6,000 medicinal plants. What's changing is global appetite—consumers are actively looking for plant-derived, clean-label, and science-backed alternatives. India has the ingredients, the tradition, and increasingly, the science. What it now needs is scale, credibility, and international presence.

India's nutraceutical market, with a current size of US\$8 billion, is expanding steadily—however, its full potential remains untapped. The target of reaching the US\$100 billion goal in 2047 comes into focus—provided we integrate trade strategy, scientific validation, simplifying regulation, and global brand positioning.

Our heritage, the world's opportunity

Indian botanicals like ashwagandha, turmeric, and moringa are no longer niche—they are becoming central products within global wellness store shelves. Traditional is suddenly trending. Global trends, however, can be surfed by institutional backing. The FTA offers tools to help the nutraceutical industry navigate the path through reduced tariffs on processed food, smoother regulatory procedures, and increased professional mobility.

These are levers Indian nutraceutical firms can pull to enter markets like the UK with greater ease and lower costs. What's needed now is the policy nudge to match this trade opportunity.



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From healthcare trade to wellness leadership

The FTA also fits within India's larger trade ambitions of doubling bilateral trade with the UK to \$120 billion by 2030 and pushing high-employment sectors into global markets. Pharmaceutical and medical device exports to the UK alone touched

\$910 million in FY24, with double-digit growth. The nutraceutical industry, though structurally different, can follow a similar growth arc—if backed by serious domestic reform.

India has the biodiversity, manufacturing capacity, and cost advantage to lead the evidence-based, plant-focused nutrition space. But that leadership won't happen by default.

It will require deliberate action—policy alignment, scientific investment, and global positioning—to turn potential into scale.

Getting to \$100 billion needs more than goodwill

If India is to lead the world in holistic wellness, five clear priorities demand government attention:

◆ **Regulatory alignment and infrastructure upgradation:** India must accelerate alignment of its regulations with global standards, particularly those of the UK and EU. Harmonisation in labelling norms, mutual recognition of safety standards, and adoption of tech-enabled compliance will ease global trade. Simultaneously, lab testing and certification infrastructure must be scaled up as per the global standard and made more efficient. A nationwide network of labs supported by AYUSH and FSSAI could enable faster approvals that are recognised globally, while also raising quality standards.

◆ **Clinical trials and validation:** Lack of large-scale clinical trials remains a structural weakness. The Indian government should collaborate with industry and academia to form R&D partnerships that can generate the evidence needed to build credibility in global markets. Dedicated funding for trials on Ayurvedic and botanical interventions should be viewed as an in-

vestment in building global trust.

◆ **Joint research and innovation:** The FTA is a good basis for R&D alliances. Nutraceutical firms-especially start-ups-should be encouraged to co-develop solutions with UK institutions, particularly in areas like immunity, metabolic health, and ageing. These are not just high-need domains; they're also where plant-based solutions hold the most promise.

◆ **Financial incentives and export support:** Production-Linked Incentives (PLI) and RoDTEP should be expanded to cover nutraceuticals. Export-ready MSMEs must get working capital, venture funding, and support for building compliant global supply chains. A competitive domestic ecosystem is the best springboard for international success.

◆ **Building NutraBharat@2047:** Beyond policy and funding, India needs a concerted branding push. NutraBharat@2047 must become a global campaign-visible in exhibitions, e-commerce platforms, retail col-



laborations, and diplomatic missions. Trade attachés should actively promote the sector, not as an adjunct to pharma or food, but as a serious category in its own right.

To ensure Indian firms benefit without being overwhelmed, safeguards are essential.

These should include:

- ◆ Strict Rules of Origin to prevent misuse of zero-duty concessions
- ◆ Gradual implementation of new stan-

dards to give MSMEs breathing room

- ◆ Continued preference for Indian bidders in government procurement
- ◆ Stronger IP protections, including digital registries and global trademarks for traditional formulations
- ◆ Free trade shouldn't lead to more vulnerability. Strategic resilience must accompany strategic openness.

This is a moment to act

The India-UK FTA is more than a trade deal. It's a runway for high-potential sectors like nutraceuticals to take off globally. But the industry won't get there on policy inertia or market optimism alone.

This is a sector where India already has heritage, credibility, and momentum. What it needs is conviction-from government, industry, and investors-to shape a future where "Made in India" becomes synonymous with trusted, plant-powered, clinically validated wellness. That \$100 billion goal is not a dream. It's a decision.

THE FORMULA FOR THOSE WHO FORMULATE THE PHARMA SECTOR.

Express Pharma has been the backbone of this sector since 20 years. It is what the experts look to when the entire industry looks to them. That is because the magazine contains a potent mix of innovative ideas, cutting-edge analyses and expert insights. It's no wonder then that the finest in the field trust the foremost in the field.

Smart watches and quantum-tuned nutraceuticals

Shafiulla Hirehal Nuruddin, MD – Greenspace Herbs and Project Quantum Ayurveda Ingredients, examines how the fusion of medtech and Quantum Ayurveda promises to transform supplements from static protocols into dynamic, responsive treatments

Monitoring the body's 'Energy Signature'

Modern smartwatches integrate a suite of biosensors—photoplethysmography for heart rate and heart-rate variability (HRV), electrodes for galvanic skin response, infrared thermometers for skin temperature, and accelerometers for movement—to build a comprehensive picture of an individual's autonomic state. HRV, the beat-to-beat fluctuation of cardiac intervals, serves as a robust marker of stress and resilience, while electrodermal activity offers a window into emotional arousal and cognitive strain. Subtle shifts in skin temperature frequently precede fatigue or inflammation, providing early warning signals that traditional assessments often miss.

By continuously logging these data streams, devices generate personalised 'energy profiles' that users and brands already leverage to optimise workouts, sleep routines, and mindfulness practices. The scientific rationale is clear: autonomic markers correlate strongly with cortisol dynamics, inflammatory cytokine levels, and mitochondrial function. The next step is to translate these digital vitals into quantified 'vibes'—energetic imbalances recognized by ancient wellness systems like Ayurveda—and then to actively correct them.

The science of vibrational tuning

Quantum Ayurveda marries time-honored herbal wisdom with vibrational resonance science. In proprietary reactors, powdered botanical extracts—turmeric, *Nigella sativa*, moringa and others—are exposed to precisely calibrated electromagnetic fields and acoustic waveforms at sub-atomic frequencies. This process 'entrains' the natural oscillatory states of key phytochemicals to the resonance patterns of specific cellular



As wearable devices evolve beyond simple fitness trackers, a new frontier is emerging at the nexus of continuous biosensing and molecular-level nutraceutical engineering. Startups and established wellness brands alike are now exploring how smartwatch data can power 'quantum-tuned' herbal extracts—transforming passive pills into dynamic, adaptive therapies precisely aligned with each user's real-time physiology

receptors, enhancing molecular affinity and membrane permeability.

Laboratory assays demonstrate that resonance-entrained formulations can achieve four- to ten-fold improvements in cellular uptake compared to conventional extracts. By optimising phytochemical energy states, bioavailability surges even at nanogram

dosages, reducing pill burden and minimising off-target effects. This molecular precision opens the door to ultra-targeted formulations—each tuned not only to the botanical's active constituents but to the user's individual cellular landscape.

Integrating wearables with resonance-engineered supplements

Imagine a seamless, consumer-friendly workflow:

- 1. Continuous sensing:** Each morning, your smartwatch detects a dip in HRV and a rise in skin conductance—signatures of elevated stress and suboptimal recovery.
- 2. Energetic profiling:** Advanced algorithms map these signals to modernised *dosha* scores—'hot' (overstimulation), 'cold' (low energy) or 'damp' (stagnation).
- 3. Quantum tailored formulation:** A connected dispenser or direct-to-consumer subscription sends a nano-dose blend tuned to your profile—perhaps a cooling *Nigella sativa* complex to calm an overactive sympathetic response, or an energising moringa infusion calibrated for mitochondrial activation.
- 4. Dynamic feedback loop:** Post-dose biosensor readings validate physiological shifts, automatically refining subsequent dosing algorithms to maintain balance.

This closed-loop, AI-driven ecosystem transforms supplements from static protocols into living therapies—each microdose meticulously adjusted to an individual's evolving physiology and lifestyle demands.

Regulatory and data privacy considerations

Bringing this vision to market requires a rigorous, evidence-based approach. Regulatory agencies such as the FDA and EMA will demand comprehensive clinical trials demonstrating both safety and

reproducible efficacy of resonance-tuned extracts. Clear labeling standards, batch-tracking mechanisms, and standardised resonance parameters must be established to ensure traceability from tuning reactor to end user.

Equally critical is the stewardship of sensitive biometric data. End-to-end encryption, anonymised aggregation and transparent consent frameworks are non-negotiable. At Greenspace Herbs, we've initiated over a dozen clinical trials to validate our Quantum Ayurveda platform and are collaborating with leading medtech partners to establish interoperability and data-security benchmarks. Our goal is to fuse the wisdom of Ayurveda with modern quantum science, underpinned by the highest standards of research and privacy.

Market outlook: A multi-billion dollar opportunity

Analysts project the global personalised nutrition and supplements market will climb from roughly \$14 billion in 2024 to over \$35 billion by 2030, driven by rising consumer demand for precision health solutions. North America currently leads adoption, buoyed by mature digital-health ecosystems and early wearable uptake. However, the Asia-Pacific

region—home to both Ayurveda's origins and booming middle-class consumption—is poised for the fastest growth, supported by expanding e-commerce infrastructure and preventative-health initiatives.

For brands capable of delivering integrated hardware-software-ingredient platforms, the opportunity is vast: from direct-to-consumer subscription models to clinical-grade partnerships with healthcare systems seeking non-pharma adjuncts to chronic-disease management.

Competitive differentiation and strategic imperatives

To secure leadership in this nascent field, companies must:

Validate resonance protocols: Publish peer-reviewed clinical studies confirming enhanced bioavailability and targeted efficacy of quantum-tuned extracts.

Forge wearable partnerships: Integrate seamlessly with major smartwatch platforms—Apple Health, Fitbit, Garmin—and emerging biosensing IoT devices to embed supplement guidance within familiar user workflows.

Develop interoperability standards: Collaborate in industry consortia to define open resonance-tuning APIs and biometric-

data schemas, ensuring cross-platform compatibility.

Champion privacy and transparency: Attain recognised data-privacy certifications, offer granular user controls over data sharing, and deploy blockchain-enabled supply-chain traceability.

Brands swift to certify their resonance libraries, align with leading wearables and uphold stringent privacy standards will lock in decisive first-mover advantages.

From tracking to tuning

The convergence of real-time biosensing and vibrational phytochemistry heralds a paradigm shift in wellness. No longer will supplementation be a one-size-fits-all ritual; instead, it will evolve into an intelligent, responsive therapy—continuously calibrated to each individual's unique physiology.

For ingredient suppliers, supplement brands and technology partners alike, the imperative is clear: embrace the data revolution, invest in rigorous vibrational science, and forge strategic alliances that turn fleeting 'vibes' into quantifiable health outcomes. In doing so, they won't just ride the next wave of personalised wellness—they will shape its very crest.

CONTRIBUTOR'S CHECKLIST

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- Article length for regular columns: Between 1000 - 1500 words. These should be accompanied by diagrams, illustrations, tables and photographs, wherever relevant.
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- In e-mail communications, avoid large document attachments (above 1MB) as far as possible.
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From ayurveda to advanced formulations: Indian pharma's journey to natural women's health solutions

Arushi Jain, Director at Akums Drugs & Pharmaceuticals, highlights how evolving consumer preferences are reshaping women's health solutions in India, blending traditional systems with modern delivery formats and functional wellness

Women's health in India is changing rapidly. It's no longer just about responding to illnesses or relying solely on traditional cures. Today's wellness scene is diverse, blending age-old knowledge with cutting-edge technology and scientific advancements. Whether it's about nutrition or skincare, Indian women are looking for complete, easy-to-use solutions that fit their evolving needs and ways of life.

The oldest medical system in the world, Ayurveda, has long been important in addressing women's health, including hormonal balance and fertility issues, menopause issues and immunity through herbal interventions and lifestyle changes. Its holistic philosophy and focus on prevention continue to have great relevance for modern day health-seeking consumers that are increasingly looking for natural, safe, and side-effect-free options.

To meet these evolving preferences, manufacturers are reimagining traditional formulations through advanced, consumer-friendly delivery systems. Be it in modern tablet formats, powders, Gummies or convenient supplements, these innovations benefit bioavailability, manage taste and compliance, and, above all, allow Ayurvedic wellness to seamlessly fit into the busy lifestyles of today. This shift in accessibility reflects a larger shift in the wellness industry - which is currently transforming to accommodate convenience and efficacy, under the same umbrella.

As reported by Transparency Market Research, the size of the global Ayurveda women's health market was \$3.6 billion in 2023 and it is expected to reach \$7.2 billion by 2034, supported by increasing consumer interest in holistic and natural health offerings, especially among younger women.



Nutritional gaps and the rise of functional wellness

While Ayurveda continues to rise in popularity, systemic nutritional deficits remain. From a study conducted by the Tata-Cornell Institute it found that during the COVID-19 pandemic there were large declines in the dietary diversity of women in India, specifically a severe drop in the in-

take of fruits, vegetables, and protein-rich foods. This compounded existing micronutrient deficiencies affecting reproductive and general health.

These gaps aren't just personal but social. Women's wellness impacts family health, participation in the workforce, and economic productivity. Part of solving it is more than supplements—it requires smart, accessible nutrition that reflects reality.

This is where nutraceuticals and functional foods come in—formulations that provides concentrated doses of essential nutrients, in formats that fit how modern women live and consume. For example, from soy protein powders that support hormonal balance and bone density; to vegetarian capsules that convey clean-label actives in a format that provides as good or better bio-availability. The important shift is that efficacy needs to be aligned with convenience.

The women's health and wellness market in India was valued at \$4.66 billion in 2024, and is projected to reach \$9.58 billion by 2033, with a CAGR of 7.7 per cent—and it is a reflection of growing demand for targeted, high-performance products.

Supplements that fit a lifestyle

Women today, focus on both health and experiences. They care about taste, texture, ease of use, and even how things look when choosing wellness products. This focus has caused new and creative forms of Dosage to grow.

It's clear that gummies have become an increasingly frequent or even daily part of many women's routines. Infused with vitamins, minerals, and botanical actives, gummies bridge the gap between food and nutrition. They are also vegan, sugar-free, and catered to many specific needs, from hair



growth, PMS relief, and skin glow, while promoting compliance and satisfaction.

Soy protein supplements have long been valued for being a complete protein. Now they are being valued for helping to manage menopausal symptoms, supporting muscle mass, and supporting maternal health. Soy protein is also plant-based, making it very appealing to vegetarians and other health-conscious consumers.

Vegetarian capsules, often made from plant-derived HPMC, ensure product stability while addressing demand for clean-label, cruelty-free supplements. With lower moisture sensitivity, they are ideal for preserving delicate nutraceutical compounds.

These delivery systems aren't just new—they're strategically designed to improve adherence, absorption, and experience, helping women stay consistent on their wellness journeys.

From personal care to smarter skincare

Women's wellness isn't just about internal health—it's also about how they feel, present themselves, and care for their skin and

The women's health and wellness market in India was valued at \$4.66 billion in 2024, and is projected to reach \$9.58 billion by 2033, with a CAGR of 7.7 per cent—and it is a reflection of growing demand for targeted, high-performance products

body. As a result, there's growing demand for cosmetic products that go beyond aesthetics to offer functional, science-backed benefits.

From anti-aging serums with potent actives to hair care masks formulated for nourishment and strength, today's beauty products are expected to do more. Consumers now seek skincare that supports their unique needs—whether that's addressing sensitive skin, signs of aging, or everyday hydration—while also being safe,

pleasant to use, and sustainably packaged.

This evolution in beauty is driven by innovation in formulation and delivery, where dermatological insights, ingredient science, and user experience converge. The result? Cosmetic solutions that are not only visually appealing, but also thoughtfully designed to promote skin health and confidence from the outside in.

The road ahead: Holistic, high-performance wellness

As Indian women lead more complex, demanding lives, they are no longer satisfied with one-size-fits-all health solutions. Whether it's a nutrient-packed gummy that fits into a busy morning routine, a serum for hormonal skin changes, or an effervescent tablet that delivers relief on the go—wellness must be comprehensive, convenient, and credible.

With ancient systems like Ayurveda providing a strong foundation, and science-backed innovation powering new formats, the women's health ecosystem is poised for a revolution—one that celebrates tradition while embracing tomorrow.

Role of nanotech in revolutionising supplements and nutrient developments

Sachin Darbarwar, Founder & CEO, ZeroHarm Sciences highlight how nanotechnology is transforming nutraceuticals with faster, targeted nutrient delivery and improved absorption, paving the way for smarter, personalised supplements

Nanotechnology, the science of dealing with matter at the molecular and atomic level, is driving a new wave of innovation in the nutraceuticals industry. By breaking down nutrients into nano-sized particles, nanotechnology increases the surface area for absorption and accelerates their interaction with the body, resulting in faster and more effective outcomes. This advancement allows for precision delivery and enhanced bioavailability, especially in nutritional supplements.

One of the key breakthroughs nanotechnology brings to the nutraceutical sector is the ability to deliver supplements to specific areas within the body with much greater efficiency. Conventional supplements often suffer from poor absorption. With nano-delivery systems, nutrients can be directed to where they are needed most, in a more concentrated and controlled manner. This not only enhances the supplement's efficacy but also allows for reduced dosages, improved safety, and better overall results.

Another critical advantage of nano-formulations is their ability to provide controlled and sustained nutrient release. These systems can be engineered to dispense nutrients gradually over time or in response to specific bodily triggers such as changes in pH or enzyme levels. This ensures the body receives consistent nutrient support without the need for frequent dosing, particularly beneficial for individuals managing chronic health conditions.

By reducing dosing frequency, time-sensitive delivery mechanisms also support better adherence and user convenience, especially for those with busy lifestyles or long-term supplementation needs. This adaptability is enabling supplement brands to create smarter, more intuitive products that align with everyday habits and evolving health goals.

Nanotechnology also addresses a common challenge in nutrition, the low absorption of fat-soluble vitamins like A, D, E, and K.



With nano-delivery systems, nutrients can be directed to where they are needed most, in a more concentrated and controlled manner. This not only enhances the supplement's efficacy but also allows for reduced dosages, improved safety, and better overall results

Through nanoencapsulation, these vitamins can be made more water-soluble and stable, improving their absorption rate significantly. This has a direct impact on combating nutrient deficiencies, especially in populations with restricted diets or limited access to nutrient-rich food sources.

What's emerging is a new category: nano-nutraceuticals, an advanced blend of functional food and nanoscience. Supplements enhanced with nano-delivery systems can transport bioactive compounds such as

omega-3 fatty acids, antioxidants, and probiotics more effectively. These nano-formulations not only increase the stability and longevity of active compounds but also help them bypass digestive barriers, ensuring faster and more targeted delivery within the body.

For supplement manufacturers, nanotechnology opens new frontiers in formulation and delivery. By enhancing solubility, stability, and dispersibility, it enables the creation of innovative formats, clear liquids, soft gels, powders, and functional beverages that are both effective and consumer-friendly. This flexibility allows brands to align with evolving consumer preferences for convenient, on-the-go nutrition without compromising efficacy or shelf life.

Ultimately, nanotechnology is not just refining nutrient delivery; it's reshaping the future of personalised wellness. Nano-nutraceuticals mark a shift from generic solutions to intelligent, targeted supplementation that fits seamlessly into modern lifestyles.

From lab to label: Role of clinical trials in validating nutraceuticals

Dr Vishal Tyagi, Consultant, Fytika Healthcare Group highlights that as consumer requirements and regulatory demands grow, clinical trials are the best quality evidence development because they provide scientifically relevant data about the safety and efficacy of a product among human subjects

As the global nutraceutical business continues to expand, rigorous scientific testing has become more important. Lab testing helps gather preliminary data about health benefits of nutraceutical products, but it is through clinical trials that theoretical potential is translated into proven, evidence-backed products available on store shelves. Clinical trials bridge the interval between pre-final discovery and eventual labeling of the final product by systematically testing for safety and efficacy and determining the correct dosage in humans. It not only supports health claims but also allows compliance and builds long-term trust among consumers.

The imperative role of clinical trials in nutraceutical development

As consumer requirements and regulatory demands grow, clinical trials are the best quality evidence development because they provide scientifically relevant data about the safety and efficacy of a product among human subjects.

Consumer safety

A prime value at the time of production and sale of any health-related product. Side effects, contraindications, and drug interactions are primarily defined by clinical trials. Safety assessments include hematologic, biochemical, and vital sign measurements for assessment of deviation from baseline measurements of good health. By using stepped testing, starting with minute studies and proceeding to enormous RCTs, researchers are able to establish a viable safety profile. This data not only protects consumers but also manufacturers and brands from legal and reputational risk.



Clinical trial data are the foundation of compliant promotional ethics. Only supported claims can be promoted, and with increasing regulation of advertising practices today, clinical findings enable truthful benefit conveyance without puffery and fraud. Outcome measures like improved biomarkers, quality-of-life assessments, or symptom relief can be utilised by marketers to construct believable, compliant consumer narratives

Efficacy verification

Ultimately, any claim made about the health value of a product is based on the need for hard evidence. Clinical trials supply the scientific and statistical data to ascertain the

effectiveness of a nutraceutical. Human trials provide real-world readings on what the nutraceutical does to biological systems in real-world situations, as opposed to preclinical testing. Trials establish whether and to what extent the product creates the desired physiological response, increased immunity, improved digestion, or cardiovascular protection, and those measurements are taken in a variety of populations.

Building product credibility and novelty in the marketplace

Clinically trial-supported nutraceuticals have a huge competitive edge in the market. Evidence-based statements have science-based support, which gives them credibility among healthcare professionals, regulatory bodies, and end-use customers. Increased credibility drives consumer decision-making, particularly in those industries where end consumers favor alternative or preventive health care products. A well-documented clinical report helps companies promote their products

not just as supplements, but as complete health and wellness solutions.

Regulatory compliance

Even though regulations for nutraceuticals vary from nation to nation, most health regulatory authorities, such as the FDA, EFSA, and FSSAI, have begun to examine health claims more strictly. Clinical trials facilitate adherence to evolving regulatory requirements. Trial data generated in accordance with Good Clinical Practice guidelines (GCP) facilitates submission, compliance, and product approval on time by manufacturers. Moreover, quality clinical trials can lead to accessing global markets in which evidence-based endorsement is a requirement.

Promoting ethical and evidence-based marketing

Clinical trial data are the foundation of compliant promotional ethics. Only supported claims can be promoted, and with increasing regulation of advertising practices today, clinical findings enable truthful benefit conveyance without puffery and fraud. Outcome measures like improved biomarkers, quality-of-life assessments, or symptom relief can be utilised by marketers to construct believable, compliant consumer narratives.

Key features of nutraceutical clinical trials

While nutraceutical clinical trials have the same aims as pharmaceutical trials, there are some methodological details pertinent to the uniqueness of the nutraceutical product. They are the answers to successful clinical trial design in this case:

Dosage optimisation

Determination of optimal therapeutic dose is of utmost concern in achieving maximum clinical benefit at minimum risk. Different dose schedules will be attempted to determine the optimum and best-maintained dose range. This is not only necessary for the determination of efficacy but also in the setting of dosing habits, which can be clearly outlined on product packaging as well as consumer literature.

Safety and efficacy evaluation

Large-scale clinical trials establish thera-

Lab testing helps gather preliminary data about health benefits of nutraceutical products, but it is through clinical trials that theoretical potential is translated into proven, evidence-backed products available on store shelves

peutic effectiveness and product safety with appropriate endpoints like biomarker assessment, patient self-reporting, or augmented physiological function versus the marketed function of the nutraceutical. Safety indicators like kidney and liver function, ECG, and adverse experience monitoring are also included in the trial design to determine a reasonable benefit-risk profile.

Innovative trial designs

As most nutraceuticals are preventive in nature, conventional trial designs sometimes prove to be restrictive. More out-of-the-box strategies, such as the application of surrogate endpoints, crossover trials, and double-blinded, placebo-controlled methods, are increasingly being applied to maximise efficiency and power. Even more so, new health technologies reliant on digital technologies permit remote data capture and acquisition as well as participant compliance, again improving the data setting.

Real-world monitoring and post-market surveillance

To make the results more widely applicable, trials are usually carried out not just in research labs but also in real-life healthcare settings. Pragmatic trials monitor endpoints such as compliance, tolerability, and quality of life for a longer period of time. Real-world evidence (RWE) is used to offer more external validity of the trial outcomes as well as the capacity to monitor long-term safety, particularly for chronic use of nutraceuticals.

Compliance with Good Clinical Practice (GCP) guidelines

Clinical trials on nutraceuticals must be compliant with GCP guidelines to ensure

that the trials are believable, transparent, and reproducible. Guidelines also enhance the acceptability of trial data with the regulatory bodies, clinicians, and scientific academicians.

How science can improve nutraceutical standards

The international nutraceuticals market continues to expand at a very rapid pace, driven by continually increasing demand for preventive medicine and natural products from consumers. Only growth is matched by a need to be in a place where they are in a position to be able to guarantee the products are not only safe but scientifically proven. It is in clinical trials that the need is met.

By introducing disciplined clinical trials into the product development cycle, companies can move beyond anecdotal or traditional assertions to a science-based, fact-driven system. Not only does this comply with worldwide regulatory requirements, but it also speaks to heightened consumer expectations around accountability and transparency of consumer health products.

Apart from it, with the increased integration of healthcare across the globe, clinically proven nutraceuticals will gradually become part of treatment protocols. The choice would mainly depend on the quality of good-grade clinical evidence, and therefore, the position of clinical trials would not only be pertinent but also of vital significance.

Scientific validation matters

Clinical trials are more than a regulatory hurdle over the counter within a nutraceutical's product development pipeline; they are the science gateway that translates potential in vitro data to broadly accepted, market-forgiving solutions. Leading to efficacy confirmation, safety authentication, regulatory approval, and customer trust establishment, clinical trials pave the way for healthy development in nutraceuticals. As the market continues to evolve, continued investment in difficult human trials will be the gateway to long-term reputation, global market access, and increased public health benefits. Lab to label, clinical trials ensure nutraceuticals not only comply with but also surpass their labels and potential to enrich lives.

Older adults with higher serum folate likelier to have lower epigenetic age deviation: Study

Conversely, increased levels of blood homocysteine (an indicator of one carbon metabolism deficiencies) were associated with higher EAD in several epigenetic clock tests as well

A newly published study in The American Journal of Clinical Nutrition is calling attention to a large cross-sectional study reporting that older adults with higher serum folate are more likely to have a lower “epigenetic age deviation”.

The study shines a light on the importance of folate in cellular and epigenetic health – unlocking new opportunities for supplement formulators to innovate in the healthy aging space.

“This latest study analysed the cross-sectional National Health and Nutrition Examination Survey (NHANES) – a large, gold-standard data set – using powerful, cutting-edge machine learning tools known as epigenetic clocks.”

Dr Eric Ciappio, Senior Manager, Nutri-

tion Science, Balchem HNH said, “Epigenetic clocks examine the levels of DNA methylation at specific points on the genome that change with age to help quantify variations in biological versus chronological aging. This difference is known as epigenetic age deviation (EAD).² This recent study was particularly interesting as it tested for associations between EAD and nutritional biomarkers associated with one carbon metabolism. This essential biochemical pathway supports many physiological processes, including balanced methylation.”

Analysing data from over 2,000 adults aged 50-85 years old, researchers found that increased serum folate (a promotor of one carbon metabolism) was associated with lower EAD in several of the epigenetic clock

tools examined. Conversely, increased levels of blood homocysteine (an indicator of one carbon metabolism deficiencies) were associated with higher EAD in several epigenetic clock tests as well.

“These findings underscore the importance of folate in epigenetic health,” comments Ciappio.

He adds, “Folate plays an essential role, supplying methyl groups to be used in DNA methylation, a fundamental process which regulates gene expression and supports genomic stability. As we age, our global DNA methylation levels decrease. This is where folate’s methyl-donor function comes into play – helping to maintain cellular health and optimise the integrity of our genetic material.”



UC Irvine scientists find natural compound combo that can clear Alzheimer's-linked brain proteins

They discovered that free GTP levels declined with age – particularly in mitochondria, the cells' energy hubs – leading to impaired autophagy, the process by which cells eliminate damaged components

A form of vitamin B3 and an antioxidant found in green tea help brain cells eliminate damaged bits and boost energy levels, reduce protein plaques linked to Alzheimer's disease in aging brains

Researchers at the University of California, Irvine have identified a promising non-pharmaceutical treatment that rejuvenates aging brain cells and clears away the buildup of harmful proteins associated with Alzheimer's disease.

In a paper published recently in the journal *GeroScience*, the UC Irvine team reports that a combination of naturally occurring compounds – nicotinamide (a form of vitamin B3) and epigallocatechin gallate (a green tea antioxidant) – can reinstate levels of guanosine triphosphate, an essential energy molecule in brain cells. In tests on neurons in a dish, the treatment reversed age-related cellular deficits and improved the brain cells' ability to clear damaging amyloid protein aggregates, an Alzheimer's hallmark.

"As people age, their brains show a decline in neuronal energy levels, which limits the ability to remove unwanted proteins and damaged components. We found that restoring energy levels helps neurons regain this critical cleanup function," said lead author Gregory Brewer, adjunct professor of biomedical engineering at UC Irvine.

UC Irvine researchers found that a combination of nonpharmaceutical compounds (nicotinamide and epigallocatechin gallate) lessens amyloid beta proteins (red fragments in far-left panel) and nitrotyrosine oxidative damage (green particles in third panel), both indications of the compounds' brain-clearing properties.

The researchers used a genetically encoded fluorescent sensor called GEVAL to track live guanosine triphosphate levels in neurons from aged Alzheimer's model mice.



They discovered that free GTP levels declined with age – particularly in mitochondria, the cells' energy hubs – leading to impaired autophagy, the process by which cells eliminate damaged components.

But when aged neurons were treated for just 24 hours with nicotinamide and epigallocatechin gallate, GTP levels were restored to those typically seen in younger cells. This revival triggered a cascade of benefits: improved energy metabolism; activation of key GTPases involved in cellular trafficking, Rab7 and Arl8b; and efficient clearance of amyloid beta aggregates. Oxidative stress, another contributor to neurodegeneration, was also reduced.

This graphic depicts how the level of guanosine triphosphate decreases in aging brains. GTP is helpful in autophagy, the process by which damaged neuron fragments are cleared out of cells. A treatment studied by UC Irvine biomedical engineers restores GTP, improving cellular energy and promot-

ing brain health.

"This study highlights GTP as a previously underappreciated energy source driving vital brain functions. By supplementing the brain's energy systems with compounds that are already available as dietary supplements, we may have a new path toward treating age-related cognitive decline and Alzheimer's disease," Brewer said.

He cautioned, "More work is going to be required to find the best way to administer this treatment, since a recent clinical trial involving UC Irvine researchers showed that oral nicotinamide was not very effective because of inactivation in the bloodstream."

Brewer's collaborators were Ricardo Santana, a UC Irvine associate specialist in biomedical engineering, and Joshua McWhirt, a UC Irvine junior specialist and a Ph.D. candidate at the Medical University of South Carolina. Funding was provided by the National Institutes of Health and the UC Irvine Foundation.

Virosil Pharma: A Swiss eco-friendly disinfectant

Virosil Pharma effectively protects critical surfaces that come in contact with pharma products

Sanosil Biotech, a Mumbai-based company is the first company to pioneer the novel concept of eco-friendly fumigation in sterile areas completely replacing the use of carcinogenic proven formalin. The product Virosil Pharma is based on Hydrogen Peroxide (H₂O₂) with Silver ions. The combination of these two ingredients gives a synergistic broad spectrum of activity on all kinds of viruses, bacteria, fungi, yeasts, molds, protozoa and algae. It is a clear, colourless, odourless, tasteless disinfectant which is non-carcinogenic, non-mutagenic, revolutionary and can be used where other chlorine based disinfectants have been feared.

Virosil Pharma is presently being used in organisations and institutions such as Pfizer, Cipla, Dabur, Ranbaxy, J&J, Abbott, Serum Institute, Dr Reddy's, Lupin Labs, Cadila Healthcare, Wockhardt, Biocon, Astrazeneca, Reliance Life Sciences, etc., as a very effective fumigant and disinfectant providing an environment with microbial containment and a completely safe and sterile environment

Virosil Pharma effectively protects critical surfaces that come in contact with pharma products. Manufacturing, filling, packing and storage areas; Instruments, equipment, water tanks and pipelines – can now be pathogen free.

What's more, there's no need to re-wash disinfected surfaces or instruments since H₂O₂-based Virosil Pharma safely decomposes into water and oxygen.

The formulation has been tested in various reputed institutions in Switzerland, France, Germany, Australia and India.

MIC determination - Method based on

How effective is it?

Even at low dosages, Virosil Pharma has the power of penetrating bio-film and killing the actual bacteria, thereby providing a long residual level of disinfection

How safe is it ?

It cannot pollute waste water, because it breaks down into water and oxygen, i.e. it produces no noxious by-products.

VIROSIL PHARMA
For bacteria- free surface & Pipelines

How does it compare to chlorine?

Virosil Pharma is superior to chlorine since it imparts no taste or odour to the water and is highly effective at both hot and cold temperatures

How does it work ?

H₂O₂ is a strong oxidising agent (more powerful than chlorine or chlorine dioxide). The oxygen separated from H₂O₂ destroys the biofilm, enabling the silver to help destroy any bacteria or virus.



modified BSEN13704 (sporicidal)
Test Organisms: 1) Bacillus subtilis ATCC 6633

Disinfecting biofilms using Virosil Pharma

Virosil Pharma not only successfully penetrates bio-films and eliminates bacteria but

also maintains a long residual level of disinfection in water tanks and pipelines.

Using Virosil Pharma overcomes the disruption problem because it is absolutely safe to leave it in the water. Better still, the longer it's in the water, the better the results since it will attack the biofilms which harbour most of the bacteria populations.

The company also offers a customised disinfection audit on its website; www.sanosilbiotech.com

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RESULTS TABLE2- Microbial Counts Post Disinfectant Exposure in CFU/ml

	Microbial Counts in CFU/ml			Microbial Counts in Log Values			Log Reductions			Log Reductions		
	Virosil 10%			Virosil 10%			Virosil 10%			Virosil 10%		
	5 mins	30 mins	60 mins	5 mins	30 mins	60 mins	5 mins	30 mins	60 mins	5 mins	30 mins	60 mins
B subtilis	4900	2300	310	4.7411	5.0696	5.9400	3.6901	3.36178	2.4913	99.9981	99.9991	99.9998

Gol to host Bharat Nutraverse Expo 2025 to drive collaboration and export-led growth

The expo is expected to bring together stakeholders from over 25 countries to advance strategic partnerships, explore new markets, and shape the future of nutraceuticals in a rapidly evolving global landscape

The Ministry of Commerce and Industry, Government of India through SHEFEXIL the designated Export Promotion Council for Nutraceuticals will convene global leaders in Nutraceuticals, nutrition, health and wellness at the Bharat NutraVerse Expo 2025, taking place from September 4-6, 2025 at Bharat Mandapam, Pragati Maidan, New Delhi.

Envisioned as a high-level platform for industry, government, research and investment leaders, the expo is expected bring together stakeholders from over 25 countries - including the US, Canada, UAE, Australia, Spain, Switzerland, South Africa, Hong Kong, and EU nations - to advance strategic partnerships, explore new markets, and shape the future of nutraceuticals in a rapidly evolving global landscape.

SHEFEXIL informs that the expo is attracting some of the most influential names in the sector, including raw material suppliers KSM-66 Ashwagandha, Sami-Sabinsa, Bio-gen Extracts, Arjuna Natural, Green Space Herbs, and OmniActive; business growth strategists 6AM; and leading academia from Southern Cross University, Australia amongst others. These participants span the breadth of the industry from some of the most trusted brands and industry experts globally - from botanical research and functional food innovation to advanced manufacturing and export-ready solutions.

"The Bharat NutraVerse Expo 2025 is

more than an exhibition - it is a meeting point for visionaries, decision-makers and innovators who will shape the next chapter of our industry," said Dr Debjani Roy, Executive Director, SHEFEXIL.

"It is a place where business meets policy, research meets application, and India's capabilities meet global demand. This is the moment for India to step forward as a leading force in health, nutraceuticals, nutrition, and food-tech innovation," she said.

A statement from SHEFEXIL also educates that India's nutra sector has grown from \$2 billion in 2015 to \$22 billion in 2025, with projections to reach \$100 billion in the coming years. The expo's theme, Inspiring India's Nutraceutical Mission, reflects its commitment to export-led growth, global regulatory alignment, and the positioning of India as a world-class innovation and manufacturing hub for nutraceuticals.

The three-day gathering will feature curated knowledge exchanges, strategic business meetings, and opportunities for forging international trade relationships at the highest levels - reinforcing India's role as a central node in the global nutraceutical value chain. Regional and global leadership from Women In Nutraceuticals, the global non-profit championing gender and societal equity across the supply chain, will be present.

Bharat Nutraverse Expo 2025

The Bharat NutraVerse Expo 2025 is an in-

ternational nutraceuticals event designed to connect the most influential leaders across government, industry, research and investment. It offers:

- ◆ B2B buyer-seller meets with pre-scheduled high-value appointments
- ◆ Speaker's Lounge and Innovation Stage to spotlight cutting-edge products and ideas
- ◆ Curated networking zones to facilitate strategic alliances
- ◆ Launchpad for innovations aimed at both domestic and export markets

The themes for the conference are:

- ◆ India's nutraceutical export vision 2030
- ◆ Plant-based health innovation
- ◆ Global regulatory landscapes
- ◆ Ayurveda and modern clinical integration
- ◆ Scaling investible nutraceutical ventures
- ◆ Gender and societal equity in the nutraceuticals industry

Partners

Dates: September 4-6, 2025

Venue: Bharat Mandapam, Pragati Maidan, New Delhi, India

Theme: Inspiring India's Nutraceutical Mission

Register: <https://www.shefexil.org/Bharatnutraverse/register-your-interest.html>

For media enquiries, contact: Express Pharma & Express Nutra



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HYDR OCEL

CELLULOSE RANGE

- Methyl Cellulose
- Hydroxy Ethyl Cellulose
- Sodium Carboxy Methyl Cellulose
- Hydroxy Propyl Methyl Cellulose (HPMC)
- Low Substituted Hydroxy Propyl Cellulose (L-HPC)



The **right ingredient** can
make all the difference
in your formulations