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Advances in microbiome science are linking gut function to immunity, metabolism, brain health, and chronic disease prevention, repositioning gut health as foundational to modern nutrition. For the nutraceuticals, this shift is unlocking new opportunities with some gaps in evidence, regulation, and clinical integration

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Nutra honchos urge policy clarity, support in budget

Will Union Budget 2026-27 be the sunrise the nutra sector is waiting for, bringing policy clarity and support? Or will the policy paralysis prevail?

VIVEKA ROYCHOWDHURY
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India's nutra sector's pre budget recommendations hint at the angst of being a nascent sector, competing for fiscal support with more established big brother siblings like pharmaceuticals. But nascent is just another word for sunrise and policymakers would do well to pay attention, nurture them, create ecosystems and yes, regulate these sectors more closely.

Sanjaya Mariwala, Executive Chairman & Managing Director, OmniActive Health Technologies points out that while the nutraceutical industry has also been included in the Production Linked Incentive (PLI) scheme to give a push to local production, the Budget must now embed nutraceuticals within an outcomes framework linking future PLI support to independent clinical validation and real-world evidence, backed by a dedicated evidence fund, so that only quality-assured, science-backed products are aligned with preventive healthcare initiatives.

Suresh Garg, Founder & CMD, Zeon Lifesciences makes the case for rationalizing GST on raw materials like botanical extracts, and streamlining FSSAI approvals with global standards, which he reasons will drive domestic production and exports.

The nutra sector has many next gen entrepreneurs testing out their business acumen. Even though they have the backing of the family business, they still need policy support. Garg's daughter Yashna Garg, founder, Yugap Wellness pitches the case for expanding the MSME Credit Guarantee Scheme beyond ?5 crore and a dedicated budgetary allocation for digital-first women-led MSMEs- covering marketing, compliance, and scale-up costs which can directly accelerate sustainable growth.

Shafiulla Hirehal Nuruddin, Founder and Managing Director, Greenspace Herbs hopes that Budget 2026 will bring in regulations that guarantee ingredient quality to ensure a transparent supply chain, incentives for farmers to improve the quality of medicinal raw materials. He also calls out the need for more accessible advanced testing infrastructure, as routine checks for adulteration, microbial safety and active-compound levels are essential for high-precision herbal extracts, yet often expensive and limited geographically.

Not mincing words, Amit Srivastava, Founder and Chief Catalyst, Nutrify Today, highlights that the crucial call will be deciding who takes control: most people expect it to be the Ministry of Food Processing Industries, though establishing a separate new regulatory arm is also on the table. As he points out, this would not only speed up approvals but it would also make sure that safety and quality criteria are always met.

Srivastava's wishlist includes incentives for producing indigenous ingredients, fiscal support — such as tax benefits or export-linked incentives, and support for clinical research and evidence-based nutrition. With the right policy thrust, he feels the budget can catalyse India's transition from a largely import-dependent industry to a globally competitive nutraceutical powerhouse — generating jobs, improving public health outcomes, and reinforcing India's place on the world's preventive-health map.

Will Union Budget 2026-27 be the sunrise the nutra sector is waiting for, bringing policy clarity and support? Or will the policy paralysis prevail?

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In nutraceuticals, trust is the only asset that compounds over time

As the nutraceutical industry undergoes a profound global transformation—from reactive healthcare to proactive wellness—India is emerging as one of its most dynamic growth engines. To decode these shifts and understand what lies ahead, **Sandeep Gupta,** Chief Founder of the Expert Nutraceutical Advocacy Council (ENAC), and Founder & CEO of Nutraworks and Vitoceutix Wellnezz shares his view in an interaction with **Swati Rana**

How do you view the current growth and evolution of the nutraceutical industry in India and globally?

The global nutraceuticals market size was valued at USD 458.55 billion in 2024. The market is projected to grow from USD 500.62 billion in 2025 to USD 986.85 billion by 2032, exhibiting a CAGR of 10.18 per cent during the forecast period. Asia Pacific dominated the nutraceuticals market with a market share of 39.84 per cent in 2024.

Whereas, India's nutraceutical market was valued at about USD 30–35 billion in 2024 and is projected to grow to ~USD 63–75 billion by 2030 at a CAGR of 10–13 per cent+. Functional beverages dominate revenue share, while dietary supplements register some of the fastest growth. The key growth drivers are urbanisation and rising disposable incomes, Increased preventive health spend due to lifestyle disorders, Surge in digital adoption enabling broader access to health products.

So, what we are witnessing is not cyclical growth, but a behavioral reset. Nutraceuticals are no longer supplements to healthcare — they are becoming the first line of defence against lifestyle disorders globally. However, India's growth story is unique because it blends traditional wellness wisdom with modern clinical validation, giving Indian nutraceutical brands strong domestic and export potential.

What key changes have you observed in consumer awareness and demand for preventive healthcare solutions?

There's been a fundamental shift in consumer mindset:

- From treatment-centric to prevention-first: A large portion of consumers now incorporate nutraceuticals to support daily wellness — aiming at immunity, micronutrient balance, digestive health, metabolic function, and more
- Data-driven buying behaviour: Today's buyers research ingredients, clinical evidence, and brand transparency before purchasing — indicating higher health literacy and expectation of results
- New consumption formats: Demand is rising for functional formats — such as gummies, chewable, RTDs, drinks, single dose sachets and personalized blends — moving beyond simple tablets/capsules.

In nutraceuticals, trust scales slower than revenue — and brands that invest early in science, transparency, and quality always win long term. The brands that scale successfully are those that treat compliance, quality systems, and scientific credibility as growth enablers — not constraints

Today's nutraceutical consumer is informed, inquisitive, and outcome-oriented. They don't just ask what a product contains, they ask why it works and where the evidence is.

Key behavioral changes include:

- Daily supplement routines becoming normalised
- Preference for evidence-based formulations
- Rising demand for functional, easy-to-consume formats
- Targeted nutrition for age, gender, and lifestyle needs

What role do regulations and quality standards play in shaping a sustainable nutraceutical ecosystem in India? What policy-level changes or regulatory reforms would further strengthen India's nutraceutical industry on a global scale?

In India, nutraceuticals are governed under FSSAI's Health Supplements and Nutraceutical Regulations, 2016, which define ingredient permissibility, dosage limits, labeling norms, and claims.

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The industry is clearly moving from claim-driven marketing to evidence-driven credibility. This shift is essential if Indian nutraceuticals are to compete globally.

In terms of policy-level recommendations, I suggests:

- A distinct regulatory identity for nutraceuticals, separate from conventional foods, plays a crucial role.

- Current regulation alignment with global regulatory benchmarks such as EFSA, GRAS, and FDA frameworks

- Incentives for clinical research, innovation, technology advancement and export facilitation will exponentially grow the Indian nutraceutical industry.

Regulatory clarity doesn't slow innovation — it actually accelerates sustainable growth.

How is digital transformation—including e-commerce and data-driven insights—impacting nutraceutical businesses?

I believe digital platforms have democratised access to wellness. Today, a consumer in a Tier-2 city has the same information, choices, and personalisation tools as someone in a metro.

Digital transformation is reshaping the value chain in multiple ways.:

- **E-commerce & consumer reach:** Online channels now contribute a fast-growing share of total nutraceutical sales — driven by convenience, variety, and personalised shopping tools.

- **Data-driven personalisation:** Tools like AI-powered health apps and algorithms enable tailored supplement suggestions based on lifestyle, health data, symptom mapping, and biomarkers — increasing engagement and repeat purchase behavior.

- **Brand-consumer interaction:** Online reviews, social media engagement, and digital education content are now major trust signals influencing purchases.

- **Operational efficiency:** Digital supply-chain systems — including traceability tech (e.g., blockchain) — improve transparency, quality control, and compliance.

Which emerging segments such as immunity, gut health, sports nutrition, or mental wellness show the strongest growth potential?

> In nutraceuticals, trust scales slower than revenue — and brands that invest early in science, transparency, and quality always win long term

- **Immunity & defence supplements:** A post-pandemic staple, incorporating vitamins, minerals, and herbal adaptogens.

- **Gut health & probiotics:** Rapidly expanding, evidenced by doubled probiotics market value in India in recent years — reflecting demand for digestive wellness.

- **Sports nutrition:** Fueled by fitness culture and protein/functional performance products.

- **Mental wellness & cognitive support:** Increasing interest in formulations targeting stress, focus, and neurological health.

- **Plant-based & natural ingredients:** Greater preference for herbal, clean-label, and sustainability-friendly products

How important is sustainability in sourcing, manufacturing, and packaging for nutraceutical brands today?

Sustainability today is not just about environmental responsibility — it's about long term brand credibility and global market access. Today's consumers expect brands to lead in:

- Ethical sourcing of botanicals and raw materials.

- Green manufacturing with minimised waste/carbon footprint.

- Eco-friendly packaging (recyclable/biodegradable).

Sustainability helps brands command premium positioning and loyalty, particularly among younger demographics, and is increasingly embedded in global supply-chain and export standards.

What challenges do nutraceutical companies face in scaling while maintaining quality and trust?

In nutraceuticals, trust scales slower than revenue — and brands that invest early in science, transparency, and quality always win long term. The brands that scale successfully are those that treat compliance, quality systems, and scientific credibility as growth enablers — not constraints. In nutraceuticals, trust is the only asset that compounds over time.

As brands grow, scientific substantiation of claims is essential. Ingredient consistency — especially for botanicals — becomes harder at scale, requiring strong supplier validation and traceability systems. Rapid expansion also puts pressure on manufacturing, where quality discipline and quality controls must remain uncompromised.

At the same time, consumer skepticism persists due to historical over-claiming in the category, forcing brands to earn trust through transparent labelling and evidence-led communication. Multi-market expansion adds further complexity with varying regulatory norms.

What trends do you believe will define the nutraceutical industry over the next decade?

Looking ahead, the nutraceutical industry will be shaped by:

- Clinically validated, evidence-based products

- AI-enabled personalised nutrition

- Functional food and beverage integration

- Global regulatory harmonisation

- Sustainability-first supply chains

- Integration with digital health and diagnostics

The future of nutraceuticals lies at the intersection of science, personalisation, sustainability, and digital health — and brands that align early will define the next decade.

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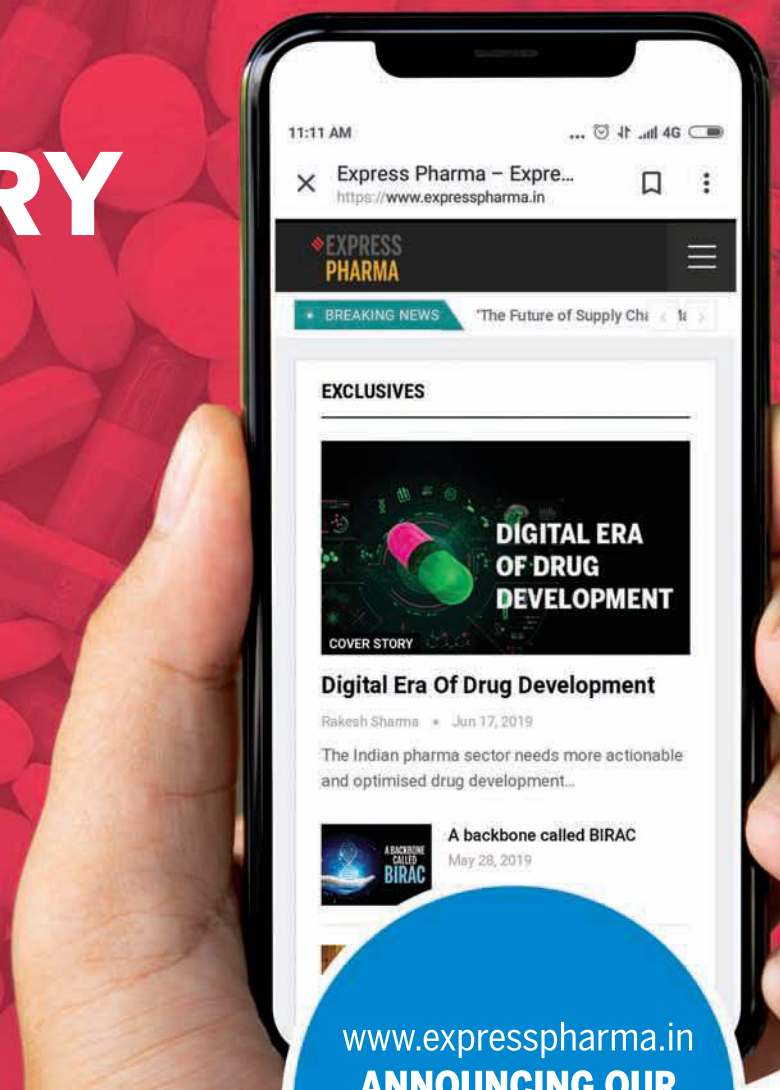

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THE GUT STORY

Advances in microbiome science are linking gut function to immunity, metabolism, brain health, and chronic disease prevention, repositioning gut health as foundational to modern nutrition. For the nutraceuticals, this shift is unlocking new opportunities with some gaps in evidence, regulation, and clinical integration

By Kalyani Sharma

Gut health is undergoing a fundamental redefinition. Once confined to digestion and episodic discomfort, it is now increasingly viewed as a core biological system shaping immunity, metabolic regulation, neurological health, and long-term disease risk. This shift reflects a deeper transformation in nutrition science from symptom management to systems-level prevention and is rapidly influencing how nutraceuticals, functional foods, diagnostics, and healthcare platforms are evolving.

At the centre of this change is the human microbiome. Advances in microbiome research, metabolomics, genomics, and AI-led analytics are revealing the gut as an active signalling hub rather than a passive organ. As a result, gut health is no longer a niche wellness category but emerging as foundational infrastructure for preventive healthcare.

Advances in microbiome science are linking gut function to immunity, metabolism, brain health, and chronic disease prevention, repositioning gut health as foundational to modern nutrition. For the nutraceuticals sector, this shift is unlocking new opportunities with some gaps in evidence, regulation, and clinical integration.

Market redefined by prevention

Globally, this scientific reframing is translating into strong market momentum. As Anil K.C, Founder and CEO, LONGENY, explains, “Globally, we are witnessing a transition in the perception of gut health from a "wellness add-on" to a fundamental component of preventative healthcare.”

Reflecting this shift, he adds, “According to one of the more popular estimates, the worldwide gut health industry is expected to reach over USD 72 billion at a compound annual growth rate of approximately 14 per cent.”

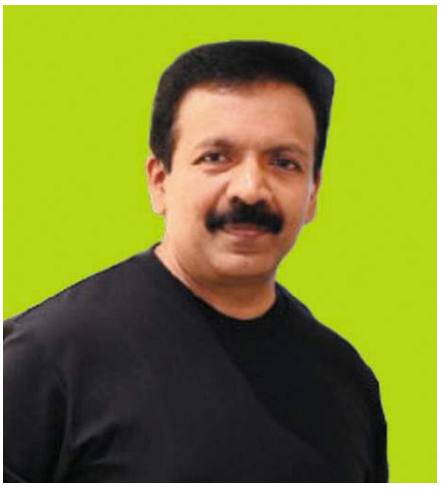
India’s trajectory is even more pronounced. Rising metabolic disorders, antibiotic exposure, and lifestyle-driven health risks are accelerating demand for preventive nutrition solutions. Rather than replicating western market evolution, India is simultaneously building awareness, access, and innovation creating both opportunity and responsibility for the industry.

Globally, we are witnessing a transition in the perception of gut health from a "wellness add-on" to a fundamental component of preventative healthcare

ANIL K.C
Founder and CEO,
LONGENY

When terminology, risk categories, and communication guidelines are aligned, the result is a safer market with more realistic consumer expectations

SACHIN GUPTA
General Manager,
Healy World India



We are moving beyond just digestion; science is now validating how specific bacterial strains can modulate neurotransmitters like serotonin and dopamine, directly impacting anxiety, depression, and cognitive focus

DR SAJEEV NAIR
Chairman and Founder,
Vieroots

FSSAI needs mandatory strain-level identification, stability testing through shelf life, and clinical efficacy data rather than just "contains probiotics" claims

SID DAS
Co-founder,
eGenome.ai

Until we fix measurement, depth, and functional interpretation, the category will remain noisy and fragile, no matter how big the market looks on paper

DARSHIT PATEL
Co-Founder and CSO,
Decode Age

Our understanding of what constitutes a "healthy" microbiome and how to apply this in practice remains rudimentary, especially for generally healthy individuals seeking precision nutrition advice

DR BILAL THANGALT M
Medical Lead,
NURA-AI Health Screening Centre

- **Clinical and diagnostic-led microbiome offerings:** Hospitals, clinics, and functional/ preventive care networks use microbiome testing, analytics, and decision-support technologies, which are gaining the most traction.
- **Ingredient science:** Compared to final consumer brands, B2B demand for evidence based ingredients is growing more quickly. Businesses in the food, pharmaceutical, and nutraceutical industries are actively looking for particular fibres, oligosaccharides, etc. that can improve immunological and metabolic outcomes.
- **Food and beverage reformulation:** On the business side, B2B growth is also robust in gut friendly formulations that add fibre and resistant starches to common foods

Source: Anil K.C.

Where B2B growth is concentrating

Despite the visibility of consumer products, the most meaningful growth is unfolding away from retail shelves. The centre of gravity is shifting toward healthcare systems, ingredient science, and food reformulation.

"Not on retail shelves. Today, the fastest growth is happening upstream - inside healthcare systems", notes Anil.

This upstream momentum is echoed by Sachin Gupta, General Manager, Healy World India, who observes, "Gut health has clearly moved from being a niche wellness topic to becoming a core pillar of preventive health, both globally and in India. Worldwide, the gut health supplements market is expected to grow from roughly USD 14–18 billion in the mid-2020s to over USD 30 billion by the mid-2030s, at an annual growth rate of about 7–9 per cent. When we look at the broader digestive health category, including foods, supplements, and related solutions, the market is projected to reach close to USD 270 billion by 2034."

He adds that "From a B2B standpoint, growth is strongest across three interconnected segments. The first is functional foods and beverages, where large FMCG and dairy brands are increasingly partnering with ingredient specialists and technology providers to add probiotics and prebiotics to everyday products. This segment has strong visibility and scale. The second area is digital and hybrid ecosystems. We are seeing a surge in apps, diagnostics platforms, and at-home testing services that integrate microbiome insights into broader lifestyle and wellness programs, rather than treating gut health as a standalone issue. The third, and perhaps most future-focused segment, is practitioner-led integrated care. Nutritionists, wellness clinics, and integrative practitioners are moving away from recommending isolated products. Instead, they are designing bundled experiences that combine nutrition, stress management, and wellness technologies.

In India specifically, corporate wellness programs, gyms, and integrative spas are emerging as strong B2B channels. These organisations are no longer looking for single products but for comprehensive metabolic and gut health solutions that bring together nutrition, movement, and bioenergetic support.

Rising metabolic disorders, antibiotic exposure, and lifestyle-driven health risks are accelerating demand for preventive nutrition solutions. Rather than replicating western market evolution, India is simultaneously building awareness, access, and innovation creating both opportunity and responsibility for the industry

From generic products to precision nutrition

A defining shift within the category is the move away from generic probiotic formulations toward targeted, outcome-oriented solutions.

As Dr Sajeev Nair, Chairman and Founder, Vieroots, explains, "Both the B2B and B2C landscapes are shifting dramatically from generic probiotic manufacturing

to precision-engineered synbiotic formulations - combinations of prebiotics and probiotics designed for specific clinical outcomes."

He further notes, "Explosive demand is seen in the corporate wellness and clinical nutrition sectors, where businesses as well as practitioners are no longer looking for off-the-shelf supplements but for efficacy-backed, condition-specific solutions. Ingredients that target immunity and stress management via the gut are currently the fastest movers in the B2B & B2C supply chains, driven by a post-pandemic consciousness about the need for systemic resilience."

Genomics-led platforms are reinforcing this transition. Sid Das, Co-founder, eGenome.ai, points out that "India's gut health market is experiencing 18-22 per cent CAGR, but it's largely commoditised with generic probiotic strains."

He adds, "The real growth is in personalised microbiome interventions where AI-driven genomic analysis determines specific strain requirements based on individual FADS, MTHFR, and metabolic gene variants. B2B medical channels prescribing DNA-tailored prebiotic-probiotic combinations are witnessing 40 per cent+ growth, far outpacing retail, because doctors see measurable clinical outcomes when formulations match genetic predispositions."

Growth outpacing scientific depth

While innovation is accelerating, experts warn that commercial momentum is outpacing the scientific depth.

Darshit Patel, Co-Founder and CSO, Decode Age says, "The biggest gap is the illusion of precision without the discipline of reproducibility. We speak as if every probiotic, every test, every "gut protocol" is incredibly personalised, while most of it is built on low-depth sequencing, small datasets, and poor standardisation. If you cannot reproducibly generate the same answer from the same sample across time and labs, you are not doing precision health, you are doing decorated guesswork."

According to Patel, another serious gap is functional understanding. We keep talking about "good" and "bad" bacteria as if we are in a school textbook. The real questions are about what genes and pathways are active, what metabolites are being produced, how those interact with host immunity, and how that changes under different diets, environments, and interventions. The industry is trying to build skyscrapers of claims on foundations that have not yet been properly engineered. Until we fix measurement, depth, and functional interpretation, the category will remain noisy and fragile, no matter how big the market looks on paper.

Advances in microbiome research, metabolomics, genomics, and AI-led analytics are revealing the gut as an active signalling hub rather than a passive organ. As a result, gut health is no longer a niche wellness category but emerging as foundational infrastructure for preventive healthcare

From a clinical perspective, Dr Bilal Thangal T M, Medical Lead, NURA – AI Health Screening Centre, highlights a similar concern. "One of the primary challenges is the absence of clear, standardised frameworks for analysing and interpreting the microbiome in clinical practice. Our understanding of what constitutes a "healthy" microbiome and how to apply this in practice remains rudimentary, especially for generally healthy individuals seeking precision nutrition advice. Although it is well established that the gut is closely connected to multiple body systems; metabolism, nervous system and immunity; integrated multi-system models are still lacking. Moreover, long-term, population-level and longitudinal datasets remain scarce, making it difficult to establish strong cause-and-effect relationships or reliably predict outcomes across diverse population groups."

He adds, "Clinical translation is further complicated by the high degree of individual variability in microbiome composition. Factors such as genetics, diet, environment and lifestyle significantly influence how individuals respond to gut-focused interventions, reinforcing the reality that no single approach can work for everyone."

Awareness without understanding

As gut health becomes mainstream, consumer awareness has surged but comprehension remains uneven.

"Sadly, there is a big difference between awareness and comprehension," says Anil

"Probiotics are now almost exclusively associated with gut health by many customers, who frequently take them as daily multivitamins. This has resulted in widespread usage, which can be detrimental when used for brief periods of time without warning. Some people think that having more bacteria is usually a good thing. Probiotics are actually strain-specific tools rather than all-encompassing remedies, and if the underlying cause isn't treated, they may occasionally be ineffectual or even dangerous. Another widespread misconception is that gut health can be "fixed" fast with a pill or a brief cleanse without altering diet variety, fibre consumption, sleep patterns, or stress levels", Anil adds.

He stresses that the industry must start talking about systems and processes instead of just products. "We must educate customers that there are no quick fixes for long-term health; rather, gut restoration involves gradually re-establishing the microbial balance, supported by data and consistent practices."

Patel reinforces this concern, noting that "Consumer understanding is not the main problem. The industry's laziness in educating is. We have sold a narrative that if your stomach feels off, you just need "more probiotics" and preferably forever. That is like saying if your city has traffic jams, you just need more cars on the road. Overuse of probiotics without context, strain specificity, and a proper look at the underlying ecosystem can blunt our ability to detect what actually works."

Without better education and transparency, the industry risks eroding long-term trust.

From an integrative health lens, Dr Khemraj Mourya, Senior Manager-R&D (Ayurveda), Mool Health points out that "Modern gut health often focuses on controlling symptoms (bloating, diarrhea, acidity) rather than addressing the fundamental cause of digestive dysfunction.

Table 1 is a clear, industry-relevant view of the key misperceptions and that the industry needs to fix.

TABLE 1

- Probiotics = Gut health (Over-simplification)
- Many consumers believe that taking any probiotic daily automatically improves gut health, which sometimes is rendered ineffective because the root cause is not being addressed or catered to
- Probiotics are like vitamins, use continuously
- Lack of awareness of who should not use probiotics
- Low awareness of "how" poor gut health can disturb the other systems of the body
- Consumers often perceive Ayurvedic remedies as slow-acting, especially compared to modern medicines.
- Confusion between symptomatic relief vs long-term health impact.
- Skepticism due to inconsistent results across products.

What the industry must do to fix this

- **Education and awareness:** Explain core concepts simply (Agni, Dosha, Ama) via digital platforms and content marketing.
- **Scientific validation:** Publish clinical studies, research papers, and case studies.
- **Quality assurance:** Highlight GMP, ISO certifications, and standardised formulations.
- **Personalisation:** Use 'Dosha-based assessments' and lifestyle guidance to show tangible benefits.
- **Modern formats:** Capsules, powders, functional foods, and digital guidance improve accessibility and perception.
- **Transparent marketing:** Clear ingredient lists, dosage instructions, and safety information build trust.

Source: Dr Khemraj Mourya

Where the science is headed

The most exciting research is now moving beyond identifying microbes to understanding what they do.

"It is, in my opinion, at the nexus of immunological signalling, metabolism, the brain, and the microbiome, expanding the topic beyond digestion into systems biology. The move towards microbiome metabolism and function is among the most exciting. Using metabolomics, deep sequencing, and AI-powered models to comprehend the real time interactions between bacteria and food, medications, and hormones. Instead of making general suggestions, this is setting the stage for customised interventions and precision nutrition", says Anil.

Dr Nair underscores the importance of the gut–brain axis, stating that "The most transformative research is undoubtedly occurring in Gut-Brain Axis - specifically in the realm of psychobiotics. We are moving beyond just digestion; science is now validating how specific bacterial strains can modulate neurotransmitters like serotonin and dopamine, directly impacting anxiety, depression, and cognitive focus. Simultaneously, in metabolic health, the discovery of how the microbiome influences insulin sensitivity and obesity via short-chain fatty acids is rewriting the rulebook for managing lifestyle diseases like diabetes and obesity."

Dr Bilal also shares that there is also growing evidence linking the microbiome to metabolic health, including insulin resistance, lipid metabolism, metabolic syndrome and fatty liver disease. Emerging research on postbiotics; beneficial compounds produced by gut microbes; is showing promise in modulating inflammation and metabolic outcomes.

Regulatory landscape

Despite innovation, regulatory ambiguity remains a critical bottleneck.

Das stresses that "FSSAI needs mandatory strain-level identification, stability testing through shelf life, and clinical efficacy data rather than just "contains probiotics" claims. We need genomic personalisation frameworks, recognising that products should carry genetic compatibility markers, not just ingredient lists. Responsible marketing requires distinguishing between general wellness products and precision therapeutic interventions backed by DNA analysis, preventing misleading "cures all gut issues" claims while enabling evidence-based personalised medicine approaches."

Similarly, Dr Bilal notes that clinical validation is still needed.

For Gupta, collaboration is key. "Effective collaboration between industry and policymakers can take several practical forms. One approach is co-creating evidence standards, where there is shared clarity on what level of clinical or real-world data is required for different types of claims, whether related to general wellness or specific health outcomes."

"Another important step is building shared education platforms for healthcare professionals and consumers. These platforms can help clarify when gut health products are appropriate, how to use them responsibly, and where their limitations lie. Finally, innovation sandboxes can play a valuable role. By allowing new formats such as digital therapeutics, at-home microbiome testing, and non-invasive wellness technologies to be assessed within clearly defined, supervised, and regulator-guided environments, innovation can be examined in a controlled manner consistent with existing legal and regulatory requirements. In practice, this means regulators, scientific bodies, and responsible brands across nutrition, nutraceuticals, and wellness technology must work together. When terminology, risk categories, and communication guidelines are aligned, the result is a safer market with more realistic consumer expectations. This collaboration can position India as a global hub for scientifically grounded, holistic solutions in gut and brain health."

Way forward

Gut health is no longer a passing wellness trend. It is emerging as a foundational layer in how nutrition, preventive care, and healthcare delivery are being delivered. For India's nutra and nutrition ecosystem, success will depend not on how fast products scale, but on how well science, regulation, and care pathways align.

The opportunity is vast but only a disciplined, evidence-led approach will ensure that gut health fulfils its promise as one of the most transformative frontiers in global nutrition and health science.

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R&D today is no longer about generic supplementation—it is about clinically validated, outcome-driven nutrition

Anup Singh, Founder and CEO, dLife Healthcare, speaks with **Kalyani Sharma** about how evidence-based R&D, precision nutrition, regulatory rigour, and ecosystem collaborations are reshaping the role of nutraceuticals in metabolic care

With chronic metabolic conditions rising sharply in India, how is the nutraceutical industry adapting its R&D priorities to meet the demand for evidence-based, clinically validated nutrition interventions?

We see the rise in metabolic disorders as a call to fundamentally rethink how nutrition science is applied in chronic care. R&D today is no longer about generic supplementation—it is about clinically validated, outcome-driven nutrition that can support metabolic correction over time. Our focus is on developing nutritional intervention backed by clinical evidence, biomarker validation, and real-world data, particularly tailored to Indian metabolic phenotypes. We invest heavily in ingredient standardisation, bioavailability enhancement, and dose optimisation, ensuring that our interventions are designed to work alongside lifestyle modification and medical supervision. The industry as a whole is moving toward science-led, protocol-based nutrition, and that is where long-term credibility will come from.

As precision nutrition gains traction globally, what innovations are emerging in ingredient science, formulation, and data-driven personalisation within the supplements and nutraceuticals sector?

Precision nutrition is transforming how nutraceuticals are conceived and delivered. We are seeing exciting innovations in ingredient science such as metabolic pathway modulators, gut-health–centric bioactives, and advanced micronutrient complexes that go far beyond basic supplementation. Equally important are formulation innovations that improve absorption and sustained metabolic impact, including controlled-release technologies and synergistic ingredient combinations. At Dlife, we integrate these advances with data-driven personalisation, using metabolic markers, lifestyle inputs, and clinical insights to tailor nutrition

interventions. This convergence of science, technology, and data allows supplements to become dynamic tools within personalised metabolic-care plans, rather than static products.

Nutraceuticals are increasingly being discussed in the context of disease prevention and metabolic health. What safeguards, regulatory standards, and quality-control mechanisms are essential to ensure safety, efficacy, and consumer trust?

As nutraceuticals move closer to preventive and therapeutic relevance, trust becomes paramount. Strong regulatory compliance aligned with FSSAI norms and GMP-certified manufacturing—is the baseline. Beyond that, brands must commit to clinical substantiation of claims, third-party testing, and full transparency in ingredient sourcing and labelling. These safeguards not only protect consumers but also elevate nutraceuticals as credible, science-backed contributors to metabolic health.

How can nutraceutical brands meaningfully collaborate with healthcare professionals, digital-health platforms, and metabolic-care programs to integrate supplements into holistic chronic-care pathways?

Meaningful collaboration requires nutraceutical brands to integrate into care ecosystems rather than operate in isolation. At Dlife, we work closely with our certified health consultants to ensure our nutrition interventions are aligned with clinical protocols and patient outcomes. Digital-health platforms play a critical role by enabling data integration, remote monitoring, and personalised feedback, allowing supplements to be adjusted based on metabolic progress. When nutrition is embedded into structured metabolic-care programs—alongside diet, physical activity, and medical oversight—it becomes part of a holistic, accountable care pathway, improving both adherence and outcomes.

Given the growing interest in drug-sparing and nutrition-first health strategies, what role do you see for supplements and functional foods in supporting long-term metabolic resilience across diverse Indian populations?

India's metabolic health challenge calls for drug-sparing, nutrition-first solutions. At dLife Healthcare, we see supplements as evidence-based nutritional supports that complement structured dietary approaches such as LCHF (Low Carb, Healthy Fat), 100g Total Carbohydrate Restriction (TCR), and our 20:20:60 nutrition framework (approx. 20 per cent carbohydrates, 20 per cent protein, and 60 per cent healthy fats). Together, these help address common gaps driven by early insulin resistance, high glycaemic load diets, and widespread micronutrient deficiencies across Indian populations. When clinically validated, culturally relevant, and used alongside lifestyle and medical guidance, these interventions can reduce disease risk, delay pharmacotherapy, and support sustainable metabolic health across diverse Indian populations.

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Trust in nutraceuticals depends on strong clinical evidence and long-term safety

Dr Rajeena Shahin, Medical Director, Physicians Association for Nutrition India (PAN India), in an interaction with **Kalyani Sharma,** shares insights on what it takes to build clinician confidence in nutraceuticals

What scientific or clinical evidence do you believe is most critical today for increasing trust in nutra products among healthcare professionals?

For healthcare professionals, trust in nutra products depends primarily on strong clinical evidence and long-term safety. Randomised controlled trials and high-quality systematic reviews remain the most trusted forms of evidence, especially when they demonstrate clear benefits in outcomes that matter in everyday practice. Evidence becomes far more meaningful when it reflects real patients—those with diabetes, hypertension, cardiovascular disease, metabolic syndrome, or gut disorders—rather than narrowly selected trial populations. Studies that link biomarkers with lifestyle factors and nutraceutical use, and that establish safety over months or years, are more convincing than short-term studies relying on surrogate outcomes.

Equally important is clarity on who benefits, who may be at risk, and safety in special populations, including older adults, pregnant or lactating women, individuals with chronic diseases, and those on long-term medications. The Indian context adds another critical layer—many nutraceuticals are adapted from Western formulations, yet dietary patterns, nutritional deficiencies, and metabolic responses differ significantly in Indian populations. India-specific research that reflects real-world clinical practice therefore plays a key role in building clinician confidence. When evidence is relevant, balanced, and easy to apply in clinical settings, it supports the responsible and effective use of nutraceuticals in healthcare.

The nutraceutical sector is witnessing rapid product innovation. What trends do you think will define the next wave of innovation in 2026 and beyond?

Both clinicians and consumers increasingly prefer solutions that integrate seamlessly into daily life, rather than complex regimens with limited real-world utility. Clean-label formulations, natural ingredients, and products designed for sustained benefits, rather than quick fixes, will define credible innovation

Nutrition science has moved beyond a single-nutrient focus toward dietary patterns, food combinations, and systems biology, making a similar shift inevitable in the nutraceutical space. Future innovation will move away from nutrient- or symptom-specific products toward systems-based, whole-person formulations that support interconnected pathways such as gut health, metabolism, inflammation, hormonal balance, stress resilience, sleep, energy regulation, and cognitive function.

Both clinicians and consumers increasingly prefer solutions that integrate seamlessly into daily life, rather than complex regimens with limited real-world utility. Clean-label formulations, natural ingredients, and products designed for sustained benefits, rather than quick fixes, will define credible innovation.

A key area shaping the next wave of nutraceutical innovation is cognitive health and human optimisation, with a clear shift away from performance "boosters" toward safe, evidence-based support that helps individuals truly thrive. Products that enhance mental clarity, focus, stress resilience, sleep quality, and sustained energy, by addressing foundational drivers such as gut health, micronutrient adequacy, metabolic stability, and sleep regulation, will define credible innovation, supporting long-term performance without overstimulation or risk.

In the Indian context, this approach is particularly important due to the coexistence of micronutrient deficiencies, protein inadequacy, and rising obesity and metabolic disease. Nutraceuticals grounded in strong science, population-relevant research, and long-term safety, while addressing foundational drivers such as digestion, sleep, metabolic stability, and mental resilience, will shape the next wave of responsible and impactful innovation.

With India moving toward stricter quality and regulatory oversight, what challenges or opportunities do you foresee for companies working in the nutraceutical supply chain?

India's move toward stricter quality and regulatory oversight represents a major opportunity rather than a constraint for the nutraceutical sector. A stronger regulatory framework has the potential to shift the industry away from loosely defined supplement models toward a more science led, evidence based ecosystem. Higher standards around ingredient quality, labelling, claims, and safety will encourage companies to build transparent supply chains, use clearer product positioning, and invest in clinical research, elements that healthcare professionals increasingly value.

While compliance may pose short term challenges, particularly for players accustomed to minimal oversight, this regulatory maturation will ultimately enhance credibility, consistency, and trust across the sector. Medical professionals and consumers alike stand to benefit from products that are safer, better studied, and more clearly differentiated. India's regulatory evolution should be seen as a filter, not a threat, but rewarding companies that anticipate regulatory direction, invest in quality and evidence, and engage responsibly with healthcare professionals, while pushing the industry toward long-term sustainability and public confidence.

As personalised nutrition gains traction globally, how feasible is it for India's nutraceutical ecosystem to shift toward more customised or targeted formulations?

Personalised nutrition is feasible in India, but its adoption is likely to be layered rather than universal. Advances in digital health tools, data analytics, and diagnostics such as microbiome testing and genetic mapping, combined with rising health awareness, are enabling more targeted nutraceutical approaches, particularly when integrated with lifestyle interventions. Age specific, gender sensitive, and condition-oriented formulations can offer meaningful benefits for groups such as women with reproductive or metabolic concerns, working adults facing chronic stress, and older individuals managing cardiometabolic risk. When aligned with dietary guidance, physical activity, and sleep support, such approaches can improve real-world health outcomes.

At the same time, nearly 80 per cent of India's nutrition challenges remain public-health driven, stemming from widespread micronutrient deficiencies, protein inadequacy, and the growing burden of metabolic disease. For this majority, scalable, population-level, evidence-based formulations addressing common nutritional gaps will have far greater impact than highly individualised solutions. A smaller, more affluent segment will opt for deeper personalisation using advanced diagnostics. The true opportunity for India's nutraceutical ecosystem lies in balancing both, strengthening foundational public-health solutions while responsibly developing personalised options for those who need and can sustain them.

What role do collaborations between industry, academia, and healthcare practitioners, play in strengthening credibility and advancing research in the nutraceutical segment?

Collaborations between industry, academia, and healthcare practitioners, grounded in a multidisciplinary approach, play a pivotal role in strengthening credibility and advancing research in the nutraceutical sector. Bringing clinicians to the forefront of nutrition research and interventions ensures that evidence is anchored in real patient needs, real-world practice, and clinically meaningful outcomes. Academic partners contribute methodological rigour and scientific validation, while industry enables the translation of research into safe, high-quality, and scalable products, helping nutraceuticals evolve from supplements into evidence-based therapeutic adjuncts.

When these stakeholders work in alignment, the focus shifts from marketing-driven claims to measurable health impact. Such partnerships improve study design, transparency, and trust across the ecosystem, benefiting both healthcare professionals and consumers.

Ultimately, a multidisciplinary, clinician-led collaboration ensures that nutraceutical innovation remains science-driven, clinically relevant, and focused on delivering genuine, long-term health benefits rather than short-term commercial gains.

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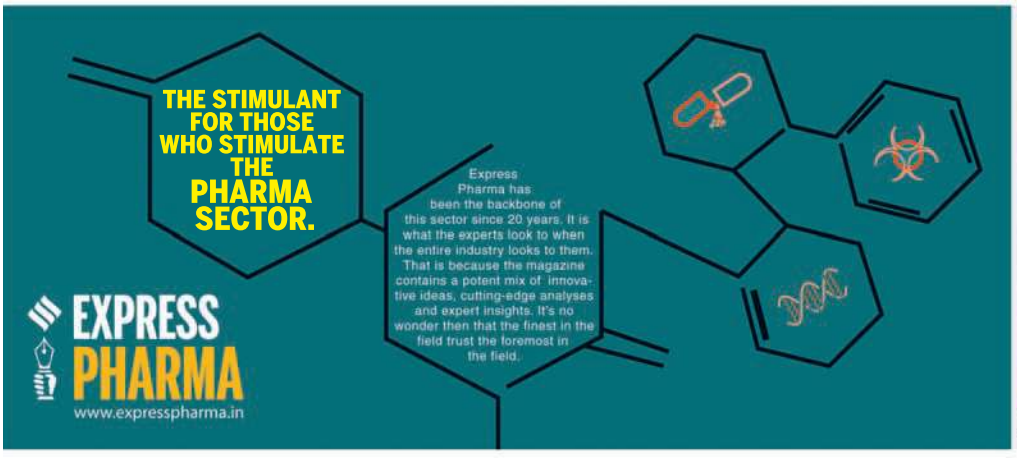

Beyond supplements: How AI and data science are redefining nutraceutical research

Dr Sanjay Agrawal, Scientific Advisor, Alkomex GBN Pharma Group USA points out that the nutra industry, powered by AI and data science, is moving from intuition-led formulations to precision, evidence-backed health solutions

The nutraceutical industry has always lived in an interesting space - part science, part tradition, part intuition. For decades, product development leaned heavily on historical use, scattered studies, and long trial-and-error cycles. But that era is ending. A new force is rewriting how we discover, validate, and deliver nutrition-based health solutions: AI and data science.

Today, nutraceutical research is no longer just about extracting the "good stuff" from plants or formulating general wellness blends. It's about decoding biological patterns, predicting responses, and tailoring interventions with near-pharmaceutical precision. AI isn't replacing the human scientist- it's handing them a telescope powerful enough to see connections that were once invisible.

This is the shift that's taking nutraceuticals beyond supplements and into truly evidence-backed, personalised, and scalable health innovation.

The new why: What's driving this transformation?

The demand for nutraceuticals has grown exponentially- consumers want natural, preventive, accessible solutions, and they want them to work. At the same time, regulatory scrutiny is increasing, pushing companies toward more rigorous science.

But the biggest catalyst is the explosion of data:

- Human genome and microbiome insights
- Wearable biomarker streams
- Global clinical and real-world datasets
- Supply-chain authenticity records
- Massive scientific literature databases

In the past, researchers couldn't meaningfully process this volume of information. Now AI can analyse, correlate, and predict outcomes at a scale no human team could match. This convergence is transforming how nutraceutical R&D starts, how it progresses,

and how it proves its value.

1. Ingredient discovery: From guesswork to precision

Traditionally, nutraceutical ingredient selection came from ethnobotanical knowledge, published trials, or anecdotal success. While valuable, these inputs were fragmented. AI changes the landscape entirely.

- Machine learning models can now:
- Scan millions of abstracts, papers, patents, and chemical profiles
- Identify molecules with anti-inflammatory, cognitive-enhancing, or metabolic effects
- Predict which compounds are most likely to succeed in controlled studies
- Spot unanticipated synergies between ingredients

Instead of screening hundreds of raw materials blindly, AI reduces the funnel dramatically, sending researchers into the lab with far more confidence. This shift cuts costs, trims timelines, and boosts success rates.

It's like moving from fishing with a net to fishing with radar.

2. Modeling mechanisms and formulations before they exist

One of the biggest gaps in nutraceutical science has been mechanistic clarity- how exactly does a compound work in the body? AI begins to fill this space by mapping complex biological interactions.

Data-driven models can simulate:

- How ingredients bind to receptors
- How combinations enhance or inhibit each other
- How the gut microbiome will metabolize specific compounds
- How encapsulation or carriers affect absorption
- Ideal dosing windows based on circadian biology

Instead of spending months reformulating blindly when a prototype underperforms, teams can now run predictive simulations and adjust intelligently from day one.

AI accelerates the journey from idea → formulation → functional product.

3. Safety, quality, and anti-adulteration: Stronger than ever

The nutraceutical industry has long battled the challenge of raw-material inconsistency, adulteration, and mislabeling- especially in botanicals where geography, seasonality, and supplier practices vary widely.

With AI-powered quality assurance:

- Mass spectrometry fingerprints detect adulteration instantly
- Machine learning identifies supply-chain anomalies early
- Consistency of bioactive compounds can be monitored batch-to-batch
- Predictive analytics warn when a supplier's material quality may slip
- Automated systems flag deviations long before they hit production

This isn't just a compliance win- it's a brand-protection win. Safety and trust are currency in the nutraceutical market, and AI

helps companies maintain both with unprecedented accuracy.

4. Personalisation: The future no longer "near"- It's here

Perhaps the most exciting frontier is precision nutrition. We've entered a world where one-size-fits-all supplements feel outdated, almost lazy. The future? Products that adapt to individuals based on who they are, how they live, and how their biology behaves.

Using AI, companies can analyse:

- Genetic predispositions
- Microbiome composition
- Blood biomarkers
- Diet patterns
- Sleep and activity data
- Real-time glucose or stress signals

From this, personalised supplement plans can be generated- targeted blends that work for your biology, not the average human from a decades-old study.

For pharma companies expanding into nutraceuticals, personalisation is the bridge between traditional consumer health and clinically grounded precision care.

5. Faster product innovation: Smarter, cheaper, more creative

AI isn't only about deep science- it's also an innovation accelerator. Nutraceutical companies often juggle cost constraints, sensory expectations, sustainability requirements, and regulatory limits. AI helps balance these variables instantly.

Modern algorithms assist with:

- Flavor profiling and masking for botanicals
- Cost-reduction modeling without compromising efficacy
- Nutrient stability predictions
- Shelf-life simulations under different storage conditions

Instead of reformulating repeatedly, teams can identify optimal combinations in silico before entering the lab.

Think of it as having a thousand mini R&D tests happening simultaneously, without touching a single beaker.

6. Bridging pharma rigor With nutraceutical agility

Pharma companies entering the nutraceutical space are uniquely positioned- they already understand clinical discipline. AI helps merge that rigor with the faster cycles of supplement development.

Where pharma processes often take years, AI allows nutraceutical R&D to adopt:

- More structured hypothesis generation
- Evidence-backed formulation decisions
- Stronger documentation
- Predictive modeling for outcome likelihood
- Robust traceability across development stages

This hybrid approach leads to products that aren't just trendy- they're defensible, consistent, and scalable globally.

The demand for nutraceuticals has grown exponentially- consumers want natural, preventive, accessible solutions, and they want them to work. At the same time, regulatory scrutiny is increasing, pushing companies toward more rigorous science

7. Navigating regulatory expectations in an AI-driven era

AI-powered R&D doesn't exempt nutraceuticals from compliance responsibilities. In fact, it raises the bar.

- Regulators increasingly expect:
- Transparent data sources
- Validated models
- Clear documentation
- Reproducible results
- Ethical data practices

Companies leveraging AI must adopt strong internal governance, ensuring algorithms support- rather than complicate- regulatory submissions and product claims.

The focus is simple: clarity, consistency, and credibility.

8. Data ethics: The soul of personalisation

With great data comes great responsibility. As nutraceuticals step into personalisation, companies must safeguard:

- User consent and data rights
- Genetic and health-data privacy
- Bias-free algorithms
- Transparent recommendations

Personalized wellness should empower individuals, not profile them. Ethical AI frameworks ensure that personalization remains a tool for equity, not exclusion.

A six-step roadmap to implement AI in nutraceutical R&D

For pharma and nutraceutical teams ready to begin, here's a practical, no-drama starting plan:

1. Audit your data: Identify all usable datasets- clinical, supplier, QC, consumer, omics, and digital health.

2. Choose one high-impact pilot: Examples: botanical authentication or predicting bioavailability of new formulations.

3. Build smart partnerships: Collaborate with AI labs, universities, or proven health-tech partners.

4. Define validation criteria early: Decide how models will be tested, documented, and audited.

5. Integrate AI into QC workflows : Use machine learning for raw-material authentication and consistency checks.

6. Scale toward personalisation: Start with population-level insights, then move to personalised product lines.

This roadmap ensures AI adoption becomes a business advantage- not an IT headache.

The bottom line: A new nutraceutical era has already begun

AI and data science aren't futuristic add-ons- they are now the backbone of modern nutraceutical innovation. They help researchers see deeper, predict smarter, and personalise with purpose. The industry is shifting from generic wellness to targeted, measurable, evidence-backed solutions.

For pharma companies expanding into this space, AI offers a rare advantage: the ability to merge scientific rigor with consumer-friendly agility. The winners of the next decade will be those who embrace this fusion early, boldly, and intelligently.

Nutraceuticals are no longer just supplements. They are science-driven wellness technologies. And with AI as the silent engine, the industry's next chapter is brighter, faster, and far more human-centric than ever before.

India's nutraceuticals market in 2026

Abhishek Jain, Business Head – Vantage Nutrition shortlists the trends to watch and how innovation will shape the future

India's nutraceutical landscape is rapidly evolving, propelled by rising health awareness, regulatory tightening, and changing consumer expectations. What was once perceived as a niche segment has now become mainstream, with consumers demanding high-quality food products backed by transparent science and clear, efficacious label claims. As we move into 2026, several key trends will define India's nutra market, presenting both opportunities and responsibilities for brands committed to quality and innovation.

1. Consumer shift from treatment to preventive wellness: Indian consumers are increasingly shifting from reactive healthcare to preventive wellness. Nutraceuticals are now integral to daily health routines, with immunity, gut health, metabolic wellness, and vitality products driving growth. Immunity-supporting formulations (vitamins C, D, zinc, probiotics, and botanicals) continue to be strong drivers, reflecting heightened awareness of preventive care post-pandemic.

2. Regulatory evolution and quality as a differentiator: FSSAI continues to strengthen its regulatory oversight on nutraceuticals, focusing on ingredient safety, permissible limits, and substantiated claims. With increasing regulatory scrutiny and compliance drives, products that lack standardized formulations or make exaggerated claims face greater risk of market rejection.

For consumers, this heightened regulatory focus translates into rising trust — but also higher expectations from brands. Transparent labelling, third-party testing, and |adherence to strict good manufacturing practices will no longer be optional; they are fast becoming prerequisites for credibility. For companies like Vantage Nutrition, this trend aligns with our long-standing commitment to advanced quality assurance and scientifically validated formulations that meet both regulatory demands and consumer expectations.

3. Rise of clean-label and natural ingredients: Clean-label products — those with transparent ingredient lists, minimal processing, and no artificial additives — are rapidly gaining favour with Indian consumers. Whether plant-based vitamins, herbal extracts, or botanicals, the market is rewarding products that combine traditional wisdom with modern technology and science.

This trend resonates particularly well with India's cultural affinity for natural remedies, giving brands an edge when they can authentically merge this heritage with evidence-based formulations. Sustainability considerations — from responsibly sourced raw materials to recyclable packaging — further bolster consumer trust and brand loyalty.

4. Personalised and technology-driven nutrition: 2026 will see personalised nutrition transition from a buzzword to a strategic frontier. Advances in artificial intelligence (AI), data analytics, and digital health platforms are empowering brands to tailor nutritional recommendations based on individual health metrics, lifestyles, and preferences.

By leveraging AI-driven insights, companies can accelerate product innovation, optimise ingredient blends, and even predict consumer needs before they become mainstream demands. This capability is especially relevant as Indian consumers, particularly in urban centres, become more savvy about health tracking, biomarkers, and customised wellness solutions.

At Vantage Nutrition, embedding advanced scientific and technological approaches into product development allows us to meet these emerging expectations. Our approach to formulation — informed by data and validated through rigorous research — exemplifies how technology can drive both efficacy and consumer relevance.

5. E-commerce and digital engagement expansion: The proliferation of e-commerce platforms and direct-to-consumer (D2C) models has expanded access to nutraceuti-

cal products well beyond traditional retail. Younger, tech-native consumers are more likely to discover, evaluate, and purchase supplements online, reinforcing the importance of digital presence and brand storytelling.

Digital channels also offer valuable data on consumer behaviour, enabling targeted engagement and education — critical in a market where informed choice is becoming increasingly important. Subscription models, interactive wellness content, and social media outreach will continue to drive consumer loyalty and lifetime value.

6. Focused segments: Women's health, fitness and healthy ageing: Specialised segments such as women's health, sports nutrition, and age-related wellness products are gaining traction. Whether it's formulations designed for hormonal balance, muscle recovery, or joint and cognitive support, consumers are looking for precise solutions tailored to life stages.

This trend aligns with broader demographic shifts — India's active fitness culture, rising maternal health focus, and growing older population are collectively expanding demand for customised nutraceutical solutions.

As the Indian nutra market matures, brands that prioritise quality, scientific validation, and transparent communication will be best positioned for success. Consumers are no longer satisfied with generic claims; they demand proven benefits, clear labelling, and formulations designed for real health outcomes

Quality, transparency and innovation as market imperatives

As the Indian nutra market matures, brands that prioritise quality, scientific validation, and transparent communication will be best positioned for success. Consumers are no longer satisfied with generic claims; they demand proven benefits, clear labelling, and formulations designed for real health outcomes.

Advanced technologies, from formulation science to AI-enabled personalisation, will be key enablers in delivering these expectations. At Vantage Nutrition, our emphasis on innovative dosage forms, robust quality control, and evidence-based product development reflects the very trends shaping 2026. By aligning with regulatory frameworks and consumer demands, the industry not only strengthens trust but also unlocks new avenues for sustainable growth and lasting wellbeing. Companies aligning innovation with credibility will shape the next phase of sustainable growth in India's nutraceutical ecosystem. Together, these forces are propelling India toward not just larger nutraceutical consumption, but a more informed, quality-driven, and health-centric future.

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The regulatory landscape for probiotics: India's evolving standards and best practices

Dr Neerja Hajela, Chief Scientific Officer-Science and Regulatory Affairs, Yakult Danone India stresses that as the market grows, there is an urgent need for robust regulation to ensure that probiotic products are safe, effective, and backed by scientific evidence

Once considered a niche concept, probiotics have evolved into a mainstream health phenomenon. From fermented dairy drinks to high-end nutraceuticals, "friendly bacteria" are increasingly embraced by consumers seeking better digestion, stronger immunity, and overall wellness. With its growing health-conscious population and rapidly expanding functional food industry, India is emerging as a promising hub for probiotic innovation. However, as the market grows, there is an urgent need for robust regulation to ensure that probiotic products are safe, effective, and backed by scientific evidence.

The booming market

According to Grand View Research, the Indian probiotics market generated USD 5,738.1 million in 2023 and is projected to touch USD 16,151.1 million by 2030. This rapid growth is driven by increasing awareness of gut health, the rise of preventive healthcare, and the entry of both domestic and international players. With such expansion comes a key challenge: the need to differentiate clinically validated probiotics from untested products making exaggerated claims.

Recognising this, India's regulatory authorities have taken important steps toward creating structured, science-based frameworks for probiotic testing and commercialization.

Paving the way: Indian Council of Medical Research (ICMR) – Department of Biotechnology (DBT) recommendations

The first significant milestone came in 2011 with the publication of the ICMR–DBT Guidelines for Evaluation of Probiotics in Food in the Indian Journal of Medical Research. This landmark document laid the foundation for regulatory oversight of probiotics in India, setting clear standards for the identification, testing, and labelling of probiotic strains and products.

These regulations emphasised that safety is the cornerstone of probiotic research. Any strain marketed as a probiotic must demonstrate the absence of pathogenicity and infectivity. Additionally, the guidelines reinforced that probiotic benefits are strain-specific—not all probiotics are created equal. For a product to be effective, the bacterial strain must be scientifically validated to deliver the claimed health benefit.

The ICMR–DBT framework also outlined a comprehensive evaluation pathway, starting with in vitro tests of the probiotic strain for acid and bile tolerance, followed by in vivo animal safety studies, and culminating in human clinical trials to assess efficacy. The guidelines emphasised the importance of thorough documentation, accurate labelling, and the deposition of strains in recognised microbial repositories to ensure that probiotic strains are traceable, accountable, and verifiable.

Advancing regulation: Food Safety and Standards Authority (FSSAI) 2022 regulations

While the ICMR–DBT guidelines provided the scientific foundation, the Food Safety and Standards Authority of India (FSSAI) built upon this framework with the Food Safety and Standards (Health Supplements, Nutraceuticals, Foods for Special Dietary Use, Foods for Special Medical Purpose, and Prebiotic and Probiotic Foods) Regulations, 2022.

This comprehensive framework defines the criteria for a product to be officially recognised as a probiotic in India. It specifies labelling requirements, permissible bacterial species, and approved health claims, providing both clarity and consumer protection. Importantly, probiotics are prohibited from using medical terms such as "treat," "cure," "prevent," or "alleviate," clearly distinguishing these food-based products from pharma drugs.

The regulations further require compliance with Good Manufacturing Practices (GMP) and certifications such as HACCP, OHSAS, and ISO, ensuring that every stage from production to packaging—adheres to rigorous quality standards. This emphasis on manufacturing excellence and is especially critical, as probiotic strains are living organisms that must remain viable throughout their shelf life to confer the intended health benefits.

Quality standards, transparency, and global harmonisation

As consumer demand continues to rise, standardisation and precise labelling are essential to maintaining credibility and trust within the probiotic market. Product labels should clearly specify the Genus, Species, and Strain of each probiotic, along with the viable cell count at the end of shelf life and the recommended serving size required to achieve the stated benefits. Such transparency not only empowers consumers with accurate information but also enhances confidence in an increasingly crowded and competitive marketplace.

Experts emphasise the importance of harmonising probiotic standards and express optimism that Codex Alimentarius—the international body setting food standards, guidelines, and codes of practice to ensure safety, quality, and fairness in global trade—will incorporate specific standards for probiotic foods. Such harmonisation would enable Indian probiotic products to align with international benchmarks, opening export opportunities while safeguarding consumers from misleading or unsafe products.

The evolving regulatory landscape for probiotics in India reflects a global movement toward evidence-based functional nutrition. As companies continue to innovate and expand their product portfolios, maintaining a focus on scientific validation, ethical marketing, and consistent quality assurance is essential

Fostering a culture of quality and scientific integrity

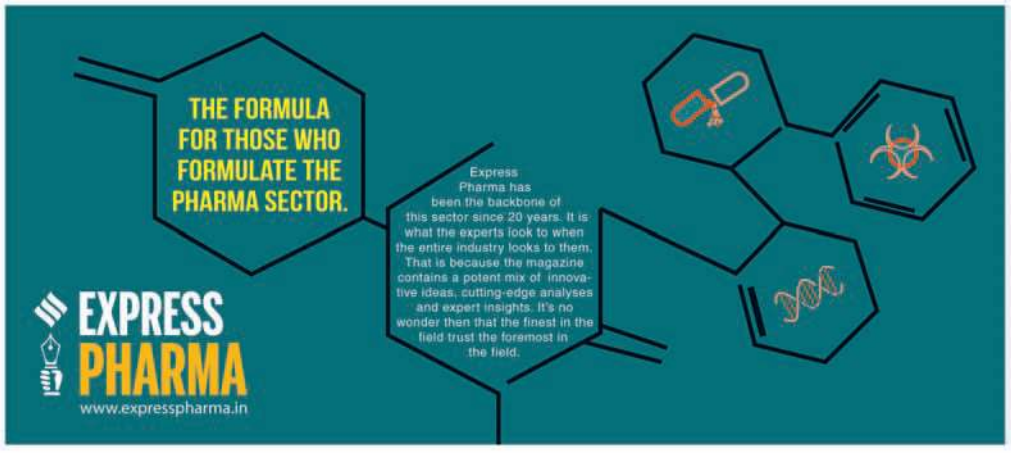
The evolving regulatory landscape for probiotics in India reflects a global movement toward evidence-based functional nutrition. As companies continue to innovate and expand their product portfolios, maintaining a focus on scientific validation, ethical marketing, and consistent quality assurance is essential. To strengthen credibility and stand out in a competitive market, many manufacturers are now investing in research collaborations and clinical trials to substantiate their product claims.

Meanwhile, consumer education remains essential. Although probiotics hold significant promise, their benefits depend on factors such as consistent use, appropriate dosage, and specific strain selection. Enhancing consumer awareness of these aspects can promote informed decision-making and responsible usage.

The future of probiotics: Rooted in trust, driven by science

India's probiotic industry stands at the intersection of innovation and accountability. With robust frameworks like the ICMR–DBT guidelines and FSSAI's 2022 regulations, the nation is advancing toward a future where probiotics are not just trending products, but scientifically validated, safe, and effective solutions for everyday health.

As the probiotic market continues to grow, sustaining a balance between expansion and effective regulation will be crucial. The true potential of probiotics in India goes beyond merely fortifying foods with beneficial bacteria — it lies in fostering a culture of trust, transparency, and scientific integrity, where every product genuinely fulfils its promise of promoting better health and well-being.



Nutrition: A blind spot in medical education

Dr Vanita Rahman, Lifestyle Medicine Physician, Physicians Committee for Responsible Medicine (PCRM) points out that most doctors are still trained without practical nutrition skills. Reforming medical education to make nutrition a core clinical competency is essential for effective, preventive healthcare

India's medical curriculum was built for an era when undernutrition was the dominant concern. Today, with 254 million Indians overweight or obese and 100 million living with diabetes, the challenge is exactly the opposite. Other countries are also confronting shortcomings in how they prepare doctors for diet-driven disease. In the US, for instance, health secretary Robert F Kennedy Jr. has warned medical schools to integrate nutrition into training or risk losing federal funds. India cannot afford to lag behind.

In India's MBBS program, nutrition is usually folded into biochemistry and community medicine, rather than being taught as a standalone subject with separate weightage. The few hours spent on nutrition training tend to focus on synthesis and absorption of nutrients at a molecular level rather than as a clinical tool.

Students learn metabolic pathways in detail but rarely discuss how to help a diabetes patient build a healthier thali or reduce salt and processed food intake. Nor are they exposed to evidence-based dietary patterns, such as plant-based or plant-forward diets, that have been shown to prevent and even reverse chronic disease.

This educational gap persists while more than 1.7 million Indians die annually from diseases linked to poor diet and weight levels. According to the World Heart Federation, 80 per cent of premature heart disease, stroke, and type 2 diabetes could be prevented through improved diet and lifestyle changes.

Noncommunicable diseases – strongly linked to poor diet and lifestyle – are projected to cost India over $4.5 trillion in lost economic output by 2030, according to the World Economic Forum. At the household level, families affected by NCDs spend, on average, more than twice as much on treatment compared to those without. That is money diverted from education, opportunity, and savings – swallowed up by avoidable illness.

Yet the doctors treating these conditions often lack the training to provide effective nutritional guidance. Patients routinely turn to doctors for dietary advice, but most physicians report feeling underprepared to provide it.

This is not just a problem in India. A 2018 study concluded that, across countries, nutrition education for medical students is consistently insufficient. In the US, students receive just 19 to 24 hours of nutrition training in total. Seventy-five percent of medical schools and 86 per cent of residency programs have no required clinical nutrition training, and only 14 per cent of practicing clinicians feel confident discussing nutrition with patients.

In the UK, only 26 per cent of doctors report being confident in their knowledge, with most citing lack of training as the primary barrier to giving advice. Australia shows similar results: while medical students recognise nutrition's importance, a majority feel "not very confident" in their skills.

Some countries are now beginning to course-correct. In the US, an expert panel has outlined 36 core nutrition competencies for medical education, covering assessment, communication, and treatment. In the UK, the Association for Nutrition has recommended a structured undergraduate curriculum for medical schools. These initiatives demonstrate that integrating nutrition into training is not only possible but practical. India should not lag behind.

What would reform look like? Three concrete steps could close the gap:

1) Make nutrition a core, required competency across pediatrics, internal medicine, and community health and assess it formally in exams.

2) Train faculty to teach practical skills through case-based learning, culinary medicine, including practical exposure to plant-based meal planning and culturally relevant dietary counseling.

3) Provide CME modules tailored to specialties in formats doctors actually want to use.

Predictably, two challenges surface in adopting this approach. Some experts may argue that the medical curriculum is exhaustive and that students are already overburdened. Alignment with other disciplines may also be an obstacle to facilitating nutrition education in medical curricula. However, the reality is that in India's strained health system, a doctor's brief, evidence-based guidance may be the only nutrition counseling a patient receives. That makes equipping physicians with practical nutrition skills even more critical.

Training doctors to use nutrition advice is one of the most cost-effective, scalable interventions India can make against NCDs. Reforming medical education to include robust, practical nutrition training is not about adding another layer to an already crowded syllabus. It is about aligning the education of doctors with the health realities of the nation.

Otherwise, we will keep graduating healers without one of the safest, most scalable methods of chronic disease management we have.

How Indian nutra brands can build global trust and market access

Dr Saurabh Arora, MD, Auriga Research highlights that India's nutraceutical future depends on science, not sameness. Global trust will come from quality manufacturing, proven ingredients, and transparent validation

The global nutra industry has grown dramatically after COVID but this growth has also created an overwhelming wave of Me Too products. Whenever an ingredient becomes popular for example magnesium or ashwagandha hundreds of manufacturers release similar formulations. This makes it extremely difficult for any brand to stand out and build credibility. In this environment global trust now depends on proven quality and verifiable science.

Indian companies are uniquely positioned to meet this challenge because the country has a long and deep legacy of manufacturing high quality generic products that meet global standards. Decades of pharma experience have created strong capabilities in following good manufacturing practices including quality control validated analytical methods and reliable release testing. Extending these strengths to nutraceuticals gives India a natural advantage in producing safe standardised and internationally acceptable products.

Traditional knowledge systems Ayurveda Siddha and Unani offer another powerful differentiator. They provide a rich foundation of botanicals and formulations that can inspire novel nutraceutical ingredients and compositions. However global buyers no longer accept claims based only on general published literature. They expect brand specific evidence. This means each formulation must be standardised clinically validated and supported by data that is easy for consumers to access and understand. Clinical outcomes standardisation protocols and even bioavailability information now directly influence buying decisions.

Traceability is emerging as a critical element of global trust. For a truly differentiated nutraceutical product visibility must begin at the farm level. Consumers and buyers want to know where the plant was grown how it was harvested how the extract was prepared

how it was standardised and whether identity and purity were tested with validated reproducible methods. Once ingredient sourcing is aligned formulation development must ensure stability across the entire shelf life. These stable formulations should then be taken into clinical studies designed with the right protocols credible study sites and qualified investigators so that all claims made on the product can be proven with confidence.

Consumers today expect clinically proven products. Brands that invest in rigorous clinical studies using their own finished formulation not generic literature immediately stand apart. After development is complete each batch must be tested and certificates of analysis should be made easily accessible. Many brands now link their analytical reports through QR codes on packaging so that consumers can verify the absence of heavy metals pesticides and other toxins and confirm that the active ingredient levels are accurate. India has a strong capability and cost advantage in batch wise testing which makes this practice scalable for brands of all sizes.

Examples from the global market show that scientific rigor produces long term success. Ingredients such as KSM in the ashwagandha category and C3 Complex in the curcumin category have become world leaders because they invested early in strong standardisation clinical validation and transparent quality systems. Their journeys illustrate what Indian nutraceutical brands can achieve when science is placed at the core of product development.

The final step in building global trust is regulatory alignment. Each international market has its own expectations and guidelines which influence analytical methods claim structures documentation formats and clinical study requirements. Brands must integrate these expectations at the beginning of their development process. Increasingly we are supporting companies in designing multicountry clinical studies including studies conducted in the US so that data generated is relevant to the region where the product will be sold. Testing a formulation on the same ethnicity and region where it will be marketed creates an even stronger layer of trust.

Nutraceuticals are a long term investment and scientific standardisation clinical validation GMP discipline and regulatory readiness may seem extensive but they pay back significantly over time. As global demand grows and competition intensifies Indian nutra brands have a meaningful opportunity. By combining pharma grade manufacturing with traditional knowledge validated science transparent quality systems and early regulatory alignment India can create nutra brands that earn deep trust and achieve strong access in global markets.

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 modified BSEN13704 (sporicidal)

Test Organisms: 1) Bacillus subtilis ATCC 6633

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.

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 I0%			Virosil I0%			Virosil I0%			Virosil I0%		
	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

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