Dr. J.B. Prajapati on Gut Health, Sustainable Nutrition, and the Next Frontier for Dairy Science

by
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Amid climate pressures, lifestyle diseases, and rising consumer awareness, scope exists for exploring newer vistas for orchestrating growth of dairy industry. Once seen as basic nutrition, it is now a platform for functional foods, microbiome health, and sustainable nutrition. Only a few have shaped this shift like Dr. J.B. Prajapati – eminent dairy microbiologist, former Principal, Dairy Science College, Anand, and Chairman, Verghese Kurien Centre of Excellence, IRMA.

As IDA West Zone Chairman, he has decades of expertise in fermentation, probiotics, and functional dairy foods. In this wide-ranging conversation, Dr. Prajapati shares insights on global nutrition, gut health, fermented dairy, regulations, and the future of dairy education in India."

The Global Nutrition Challenge: A World Still Struggling with Food Security

Despite tremendous advances in agriculture and food production, the world continues to face severe nutritional challenges. For Dr. Prajapati, the conversation began with a reminder embedded in India's own constitutional philosophy.

"***Article 47 of the Constitution of India places a duty on the State to raise the level of nutrition and improve public health. Even today, this remains a fundamental responsibility.***"

Recent global data reinforces how urgent this challenge remains. According to FAO and WHO reports from 2025:

- Nearly 700 million people globally faced hunger in 2024.
- Around 2.3 billion people experienced moderate or severe food insecurity.
- The global prevalence of anaemia among women has risen to 31 percent.
- Only two-thirds of children (6-23 months) and one-third of women (15-49 years) achieve adequate dietary diversity.

These numbers highlight a critical shift in the nutrition conversation.

Dr. Prajapati believes, "The real challenge today lies in protein and minerals like calcium, zinc, and magnesium. At the same time, we must rethink excessive carbohydrate consumption and balance dietary fats appropriately."

He says, "In this context, dairy plays a uniquely important role. As a nutrient-dense, high-quality protein source, dairy products can address multiple micronutrient deficiencies simultaneously while remaining accessible and culturally integrated in many societies."

The Sustainability Equation: Why Fermented Dairy Matters

Global food discussions today are increasingly framed around the United Nations Sustainable Development Goals (SDGs), particularly:

- **SDG 2 - Zero Hunger**
- **SDG 3 - Good Health and Well-being**
- **SDG 12 - Responsible Consumption and Production**
- **SDG 15 - Life on Land**

Dr. Prajapati believes fermented foods—especially fermented dairy—offer a powerful pathway toward achieving these goals.

"Today the global focus is on creating affordable and sustainable diets for all," he explains. "Fermented foods in general, and fermented dairy products in particular, can play a significant role in addressing this challenge."

He summarizes their advantages through four simple yet powerful pillars:

Availability. Accessibility. Affordability. Functionality.

Fermentation enhances the digestibility, shelf life, and nutritional quality of foods. In regions where refrigeration infrastructure is limited or diets lack diversity, fermented foods can become an efficient tool for improving nutritional outcomes.

Did You Know?

Fermentation can significantly improve the bioavailability of nutrients in foods by:

- Breaking down complex proteins
- Enhancing mineral absorption
- Producing beneficial microbial metabolites
- Extending shelf life naturally

This makes fermented foods particularly valuable for developing economies and rural populations.

The Gut Health Revolution: Science Driving Consumer Behaviour

One of the most powerful consumer trends shaping the food industry today is the growing focus on gut health. According to Dr. Prajapati, this shift is not merely a marketing phenomenon—it is deeply rooted in science.

"Society is becoming increasingly health conscious," he observes. "This is partly due to rising reports of food fraud and also because of lifestyle diseases such as hypertension, diabetes, obesity, and various types of cancers."

Simultaneously, advances in microbiology and biotechnology have transformed our understanding of the human microbiome. Research into the gut-brain axis has revealed that gut microbes influence not only digestion but also immunity, metabolism, and even behavioural responses.

"Today we understand that the gut is central to determining whether a person experiences health or illness," he explains.

This scientific understanding is beginning to shape consumer markets. He sees the evolution. "**The changes we are seeing in the food market today are science-driven. As our knowledge about the gut microbiome expands, consumer choices are also evolving.**"

Fermented dairy products naturally align with this trend. He shared, "Fermented milks contain beneficial microbes that positively influence gut microbiota."

Interestingly, Dr. Prajapati challenges a common assumption about this trend being limited to urban populations. "The trend may appear urban-centric," he notes, "but rural populations already understand the benefits of fermented foods. Awareness does not need to be created there-it already exists."

Understanding Functional Foods, Probiotics, and Nutraceuticals

As the market for health-oriented foods grows, several scientific terms have entered mainstream conversation-often creating confusion among consumers and even industry stakeholders. Dr. Prajapati offers a clear framework to understand these categories.

Functional Food: The basic need for food is to provide basic nutrition. If any food provides, something more than basic nutrition, it is called functional food.

Nutraceutical: Is a food, or parts of a food, that provide medical or health benefits, including the prevention and treatment of disease (Stephen, 1989)

Probiotic: Live microorganisms that, when administered in adequate amounts, confer a health benefit on the host FAO/WHO (2002); Hill *et al*/(2014)

Prebiotic: Non-digestible food ingredients that beneficially affect the host by stimulating growth and/or activity of one or a limited number of bacteria in the colon, thus improving host health Gibson *et al*/(2017)

Synbiotic : Combinations of a probiotic & prebiotic

Postbiotics: Functional bioactive compounds, generated in a matrix during fermentation, which may be used to promote health. They are being referred to as modified, inactivated, non-viable, para- or ghost probiotics also. (Wegh *et al,* 2019)

Psychobiotics: A group of probiotics that affect the central nervous system (CNS) related functions and behaviours mediated by the gut-brain-axis (GBA) via immune, humoral, neural, and metabolic pathways to improve not only the gastrointestinal (GI) function but also the antidepressant and anxiolytic capacity. (Cheng *et al,* 2019)

Dr. Prajapati added, several product formats are available to design and dispense above mentioned products. We can use simple freshly fermented liquid or semi-liquid product or paste, powder, capsules, tablets, shots or anything that depends on the food designers' imaginations.

Regulation and Scientific Validation

With the rapid growth of functional foods and probiotic products, regulatory clarity becomes essential. In India, the regulatory framework differentiates between food and pharmaceutical products.

- Food products fall under the jurisdiction of FSSAI
- Medicinal products are regulated by drug authorities

FSSAI has already established guidelines for probiotic foods.

"FSSAI has listed specific microorganisms that can be used as probiotics," explains Dr. Prajapati. "It has also

defined a minimum requirement of 10^8 live cells (10 crore) per serving at the time of delivery." However, the list of microbes is up to species level, while health benefits are specific to the strain of a particular species. He emphasizes that scientific validation must accompany marketing claims.

He also mentions that, "Human clinical trials are necessary to substantiate health claims." Another technical challenge lies in maintaining the viability of probiotic microorganisms throughout the product's shelf life-a critical factor for ensuring efficacy.

India's Untapped Opportunity in Fermented Dairy

India possesses a rich heritage of fermented dairy products that have been consumed for centuries. Yet their potential for global commercialization remains largely underdeveloped. "Products like dahi and buttermilk are already sold worldwide, so India is not unique in that sense," Dr. Prajapati explains.

However, significant opportunities exist in standardizing and scaling traditional products. "For example, salted or spiced lassi can be standardized and marketed globally." He also highlights an interesting comparison between traditional Indian foods and globally popular dairy products. "Greek yogurt is essentially similar to our maska, which is partially drained curd used in making shrikhand."

Looking ahead, innovation could lead to entirely new product categories. These may include:

- Carbonated chhash
- Indigenous versions of kefir or koumiss-like beverages
- New fermented dairy drinks positioned as healthy alternatives to sugary beverages

He is a firm believer that, "Traditional dairy wisdom combined with modern science can create powerful innovations."

Key Takeaways for the Dairy Industry

- Fermented dairy products align perfectly with global health trends.
- Gut health research is reshaping consumer food preferences.
- Traditional Indian dairy foods hold significant global commercialization potential.
- Scientific validation and regulatory compliance will be critical for functional dairy products.
- Future dairy innovation will increasingly integrate microbiology, nutrition, and biotechnology.

Clearing Consumer Misconceptions

Despite growing awareness, misconceptions about probiotics and functional foods remain widespread. Dr. Prajapati addresses several common misunderstandings.

First, not all fermented foods contain probiotics. "Probiotics require specific microbial strains and adequate dosage to deliver health benefits."

Second, the impact of probiotics is strain-dependent. "Excess consumption is not advisable."

Finally, he dismisses the belief that imported probiotic products are inherently superior. "All products are essentially equal if they meet scientific and quality standards."

Rethinking Dairy Education for the Future

Having spent more than four decades in dairy academia, Dr. Prajapati has witnessed the evolution of dairy education in India. "Dairy education in India has been strong for many decades," he says. "Diploma programs began as early as 1923, followed by degree and postgraduate programs."

He suggested that future curricula should emphasize resource efficiency, including: ●Energy management ● Water utilization ● Packaging innovation ● Manpower optimization.

At the same time, emerging technologies must become part of dairy education.

These include:

- Artificial Intelligence
- Internet of Things (IoT)
- Blockchain systems
- Carbon footprint analysis
- Advanced analytical techniques for detecting adulteration
- Development of value-added functional dairy products

He cites Vidya Dairy as a successful model of integrating academic learning with industry exposure. However, he expresses caution about aspects of the New National Education Policy, particularly the idea of students exiting programs midway with certificates or diplomas. "This may create half-prepared professionals and weaken successful professional education models."

The Microbial Future of Dairy

As global food systems evolve, the convergence of microbiology, nutrition science, health science, and consumer awareness will increasingly shape the dairy industry. Fermentation – an ancient practice refined by modern science – offers a simple yet powerful mechanism to address pressing nutritional challenges. Fermented dairy provides a scalable pathway to deliver these benefits to the masses. As Dr. Prajapati emphasizes, the smallest organisms can drive the most profound transformations.