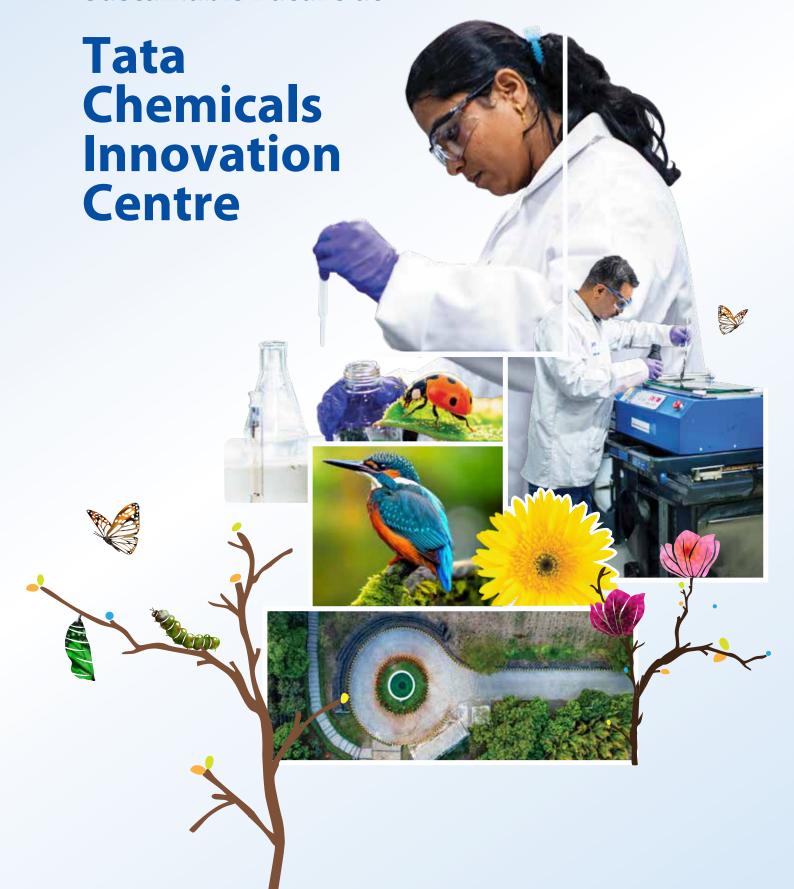


Innovating for a Green, Sustainable Future at





Serving Society through Science



In This Book

A Vision for Innovation	03-04
Inspiration from Mr. Ratan Tata	05-06
Where Innovation Begins	07-08
The Journey of Tata Chemicals Innovation Centre	09–10
A Glimpse into the Innovation Centre	11–12
Capabilities and Facilities	13–14
Breakthrough Innovation Stories	15–18
Commitment to Excellence	19–24
Life at Tata Chemicals Innovation Centre	25–26
Responsibilities That Matters	27–28
Quotes from Tata Leaders	29
Epilogue	30





A Vision for Innovation

Innovation at Tata Chemicals is a commitment to shaping a better tomorrow through science, sustainability, and ingenuity. For over two decades, a steadfast commitment to research and development has led to pioneering breakthroughs that not only advance the business and customer delight but also transform lives.

From eco-conscious chemistry to next-generation materials, the Innovation Centre in Pune serves as a hub of scientific excellence. It is where ideas take shape, transforming into solutions that tackle some of the most pressing challenges, whether in environmental responsibility, circular economy, tech-rooted social innovations, or green chemistry.

This coffee table book is a tribute to the relentless pursuit of innovation at Tata Chemicals. It captures the journey, impact, and collective passion of researchers, scientists, and partners dedicated to driving meaningful change.

Looking ahead, the focus remains on leveraging state-of-the-art technology to ensure science continues to serve humanity responsibly.

Here's to the spirit of innovation and the people who make it possible.

-Team Innovation



A Legacy of Innovation

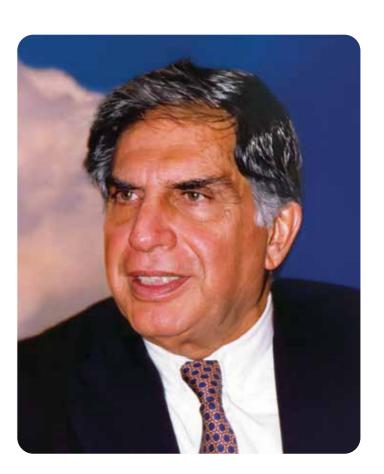
Inspired by Mr. Ratan Tata's vision, the Tata Chemicals Innovation Centre was founded in 2004 to shape the future of business. Strengthening this commitment, Tata Chemicals unveiled a state-of-the-art facility in 2014, designed to accelerate groundbreaking research and transformative ideas.

What sets the Innovation Centre apart is its multidisciplinary expertise and customer-driven problem-solving approach, ensuring that every breakthrough addresses real-world challenges while paving the way for a more enduring future.











Tata Chemicals' innovation is guided by a deep belief in science and sustainability. The research and development (R&D) philosophy prioritises green chemistry solutions, circular economy principles, co-creation with customers, and collaborations with the best R&D Labs and academia globally.

Driven by the principles of Green Chemistry, Tata Chemicals' research and development efforts focus on crafting science-led, differentiated solutions that create lasting value for industries, communities and all the stakeholders.

The Tata Chemicals Innovation Centre in Pune exemplifies how focused research and development delivers meaningful, real-world solutions. From bio-based surfactants and next-generation materials to carbon capture technologies, the centre remains at the forefront of pioneering advancements that integrate business growth with environmental goals.



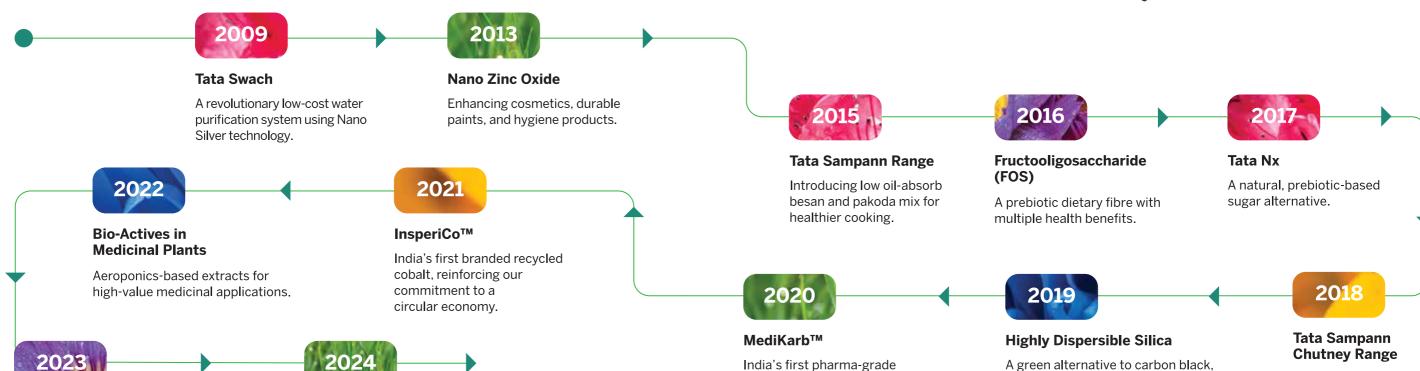


The Journey of Tata Chemicals **Innovation Centre**

Since its inception in 2004, Tata Chemicals Innovation Centre has been at the forefront of pioneering advancements that optimise industries, promote environmental responsibility, and set benchmarks in green innovation.

Over the years, its commitment to seamlessly blending cutting-edge research with eco-conscious solutions has led to breakthroughs for a better tomorrow.

Innovation Timeline



bicarbonate, setting new

industry standards.

Textile-grade nZnO

face mask challenge.

Innovating to address the COVID-19

Bio-based Surfactant

A nature-derived alternative to chemical surfactants, sourced from agri-waste.

Inulin and Oligofructose (IcFOS)

Plant-based prebiotics supporting gut health and functional nutrition.

scFOS Variants

Expanded L65, L85, and L95 for diverse industrial applications.

Probiotics & Synbiotics

Strengthened gut health solutions with indigenous innovations.

Organo-silanes

Improved tyre and rubber durability with advanced additives.

supporting eco-conscious advancements.

Tata Sampann Extruded Snacks:

A healthier snack choice.

Preservative-free chutneys, ensuring fresh taste and nutrition.







Discovering an Innovative Tomorrow

The Tata Chemicals Innovation Centre was established in 2004 with the aim of developing innovative solutions and exploring new business opportunities.

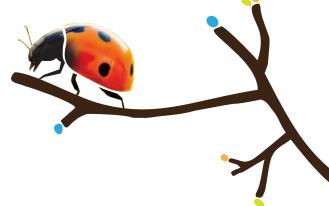
In 2014, a new state-of-the-art facility was added to a 26-acre green campus in Mulshi, Pune, to enhance scientific progress in the areas of Performance material, Nutrition solution, and Energy science. The centre also fosters collaboration between industry and academia, advancing sustainable solutions that address real-world challenges.

A Hub of Possibilities

The Innovation Centre is designed to facilitate discovery through a collaborative workspace and modern scientific infrastructure. Sustainability is an integral part of its operations, as reflected in the centre's green-certified building and ongoing efforts to optimise resources.

A Space Designed for Innovation

The Innovation Centre focuses on developing products and services positioned at the intersection of physics, chemistry and biotechnology. The research at the Centre spans inorganic chemical synthesis, biopolymers, nanomaterials, molecular biology, battery recycling, and fermentation technology. These innovations are designed to meet customer needs while supporting long-term environmental and business goals. At its core, the Centre remains committed to advancing knowledge, fostering innovation, and developing research-driven solutions for a future-ready world.







Innovating for a Better World

Since its inception, Tata Chemicals has been at the forefront of addressing global challenges, advancing public health, industrial efficiency and environmental responsibility. The company has pioneered several sustainable practices that are not

only industry firsts but also align with the long-term vision of reducing carbon footprints and promoting eco-friendly operations.

Nutrition Solutions: A Healthier Tomorrow

Tata Chemicals pioneered the development of FOSSENCE® (Short Chain Fructooligosaccharide), a 100% water-soluble, prebiotic dietary fibre, derived from the fermentation of cane sugar. This innovative ingredient promotes digestive balance, gut and bowel health, and helps in weight management while improving overall health and immunity.

With its natural sweetness and functional benefits, FOSSENCE® has become a preferred dietary fibre and sugar alternative across diverse food applications, including nutritional meals, cereals, snacks, dairy products, chocolates, and confectionery without compromising taste.

without compromising taste. Performance Material:

High Dispersible Silica

Among Tata Chemicals' notable innovations is the development of green Highly Dispersible Silica (HDS) derived from Rice Husk Ash (RHA), a significant step forward in sustainable materials. Backed by a patented green technology, this breakthrough enhances fuel efficiency, safety, and durability in passenger car tyres, supporting the shift towards greener mobility.

Used in passenger car tyres, HDS improves fuel efficiency by reducing rolling resistance and extends tyre life by 10–15%. The initiative not only enhances performance and safety but also upcycles agri-waste into a high-value industrial product.



Developed using in-house technology at the Innovation Centre, FOSSENCE® is now manufactured at a state-of-the-art manufacturing facility in Mambattu, with an annual capacity of 5,000 tonnes.

The HDS technology has been successfully commercialised at Tata Chemicals' Cuddalore plant, with a current production capacity of 10,000 tonnes per annum—demonstrating scalability and environmental responsibility.

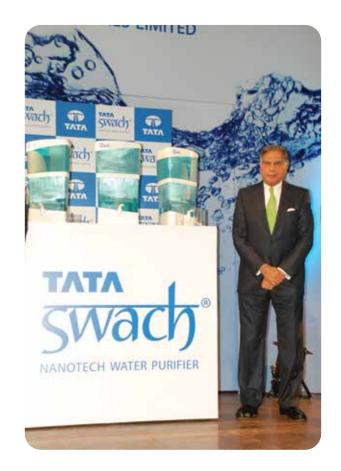
Further reinforcing its focus on eco-conscious innovation, the company has also introduced a solvent-free process to make tyre-grade silanes, ensuring minimal waste.

Purifying Lives: The Tata Swach Story

Tata Swach innovation has redefined access to clean drinking water with its low-cost, gravity-based purification technology. It integrates the anti-microbial property of nano silver with filtration properties of rice husk ash (RHA), a byproduct obtained from burning rice husks. This innovation has brought safe water to over two million households.

Tata Swach water purifier meets the Log Reduction Value for bacteria, viruses, and cysts as per USEPA (US Environmental Protection Agency) guidelines, ensuring water safety at an affordable cost.

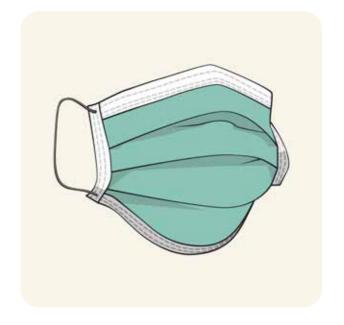
Its impact goes beyond just clean water. By empowering 1,100 village-level entrepreneurs, Tata Swach has fostered livelihoods while transforming lives. As one of the world's most affordable and innovative water purifiers, with the cost of purification at 30 paise per litre, it stands as a testament to science with purpose, delivering lasting change to communities.



Nano Zinc Oxide: Innovation in Protection

Small can be compelling. Expertise in nanotechnology has enabled Tata Chemicals to develop a performance material called nano zinc oxide (nZnO), which offers anti-fungal, anti-microbial and UV-blocking properties for industrial and cosmetic applications, including cosmetics, paints/coatings, adhesives, and plastics.

During the COVID-19 pandemic, Tata Chemicals re-engineered its nZnO to make it textile grade and provide antiviral and antibacterial properties, aiding in the production of protective face masks for frontline workers. This innovation reflects the company's commitment to well-being, resilience, and timely, science-led solutions.



Bio-Based Surfactant

Tata Chemicals has developed a bio-based surfactant molecule using agricultural bio-waste from the cashew industry. Readily biodegradable and non-irritating to skin, the product features improved water solubility and is well-suited for home care applications such as powder and liquid detergents.

Serving as an eco-friendly alternative to petroleum-derived Linear Alkyl Benzene Sulphonic Acid (LABSA), this innovation aligns with circular economy principles and generates zero waste. Recognised with the Global Tata Innovista Award, this solution reflects the company's commitment to sustainable, customer-centric innovation.



Next Generation Agri

Next-generation agriculture platforms such as aeroponics and hydroponics, a process of growing plants without the use of soil by directly supplying nutrients to their roots through mist/water-based solutions, are leveraged to grow high-value medicinal plants

with improved availability of bioactives. In addition to improving the availability of bioactives, this approach reduces freshwater consumption by nearly 80% and optimises fertiliser use, making it both efficient and environmentally responsible.







Tata Chemicals views its customers as partners in progress, a philosophy that drives the company's approach to innovation in customer engagement. The company collaborates closely with stakeholders to co-create value, ensuring mutual growth. These partnerships focus on developing customised solutions tailored to specific market needs.

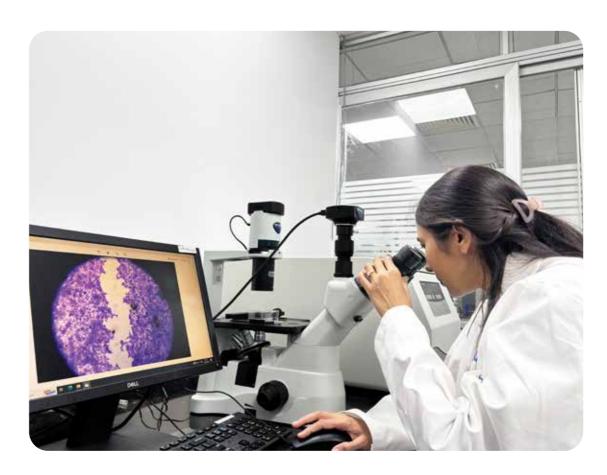


Strategic Importance of Pre-Clinical and Clinical Studies at Tata Chemicals

At Tata Chemicals, "Serving Society through Science" reflects a commitment to ethical and innovative advancements. The company conducts rigorous pre-clinical and clinical studies to ensure the breakthroughs meet the highest standards of safety and efficacy. Guided by a robust Pre-Clinical and Clinical Studies Policy, Tata Chemicals upholds scientific integrity through globally recognised protocols, ensuring ethical oversight and transparency in the research. These studies are crucial not just for compliance, but as strategic enablers of innovation and market access.

Rooted in ethics and excellence, Tata Chemicals believes in the power of science to transform industries and enhance lives.

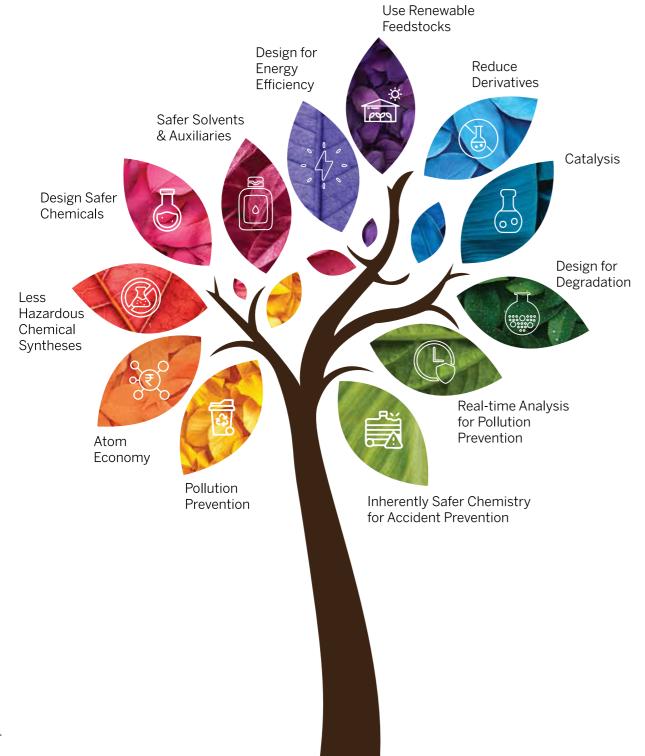




Green Chemistry

Tata Chemicals integrates Green Chemistry principles to create safer, sustainable processes—minimising waste, reducing environmental impact, and shaping a greener future.

Green Chemistry Principles





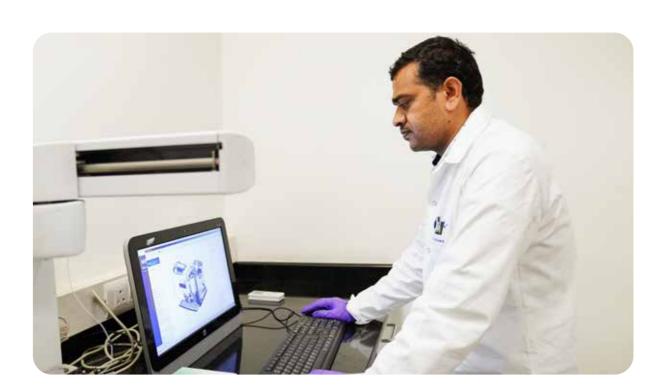
Digitisation at the Innovation Centre

Digitalising Innovation

At Tata Chemicals Innovation Centre, digital transformation is redefining research and development by streamlining workflows, enabling real-time data access, and accelerating decision-making. Through smarter R&D digitisation, laboratory operations are brought to precision with digital SOPs, integrated sample and experiment management, and structured project tracking. The Stage & Gate module further enhances project governance with centralised, secure monitoring and seamless approvals. The IPR Portal simplifies intellectual property management through automated, transparent processes—ensuring every idea is protected efficiently. Together, these digital platforms empower smarter, faster, and more secure innovation.

Accelerating Discovery with Machine Learning

Machine Learning is transforming the way traits are identified and selected. At Tata Chemicals, this technology enhances the success rate of identifying hybrids with superior traits—making the selection process faster, more efficient, and more accurate. The Crop Trait Prediction Platform, recognised at the 15th Aegis Graham Bell Awards, is a testament to this approach, accelerating discovery through data-driven precision.



Intellectual Property



Tata Chemicals has filed a total of 445 patent applications, with 175 patents granted to date. These cover a diverse portfolio of innovations across water purification, fructooligosaccharides, galactooligosaccharides highly dispersible

galactooligosaccharides, highly dispersible silica, zinc oxide, soda ash, bio-based surfactants, silanes, and more.

With an overall grant ratio of 75%, the company's intellectual property efforts reflect a strong culture of innovation and scientific rigour. Tata Chemicals has also been recognised with the prestigious CII Industrial Intellectual Property Award, underscoring its commitment to protecting and advancing homegrown technologies.





Blending Change: Transforming Nature, Transforming Lives

At Tata Chemicals, the mission is to Serve Society through Science. This commitment is reflected in efforts to create a lasting environmental and social impact.

At the Innovation Centre, biodiversity has been enhanced by expanding the green cover by 10%. Nearly 90 new native species, including trees, herbs, shrubs, and cacti, have been planted. These now support a variety of wildlife, like fox squirrels, peacocks, snakes-kraits, Russell's viper, cobras and more.

Over the past four years (FY 2021–25), around 35 snakes have been safely rescued as part of ongoing conservation efforts. The Butterfly Garden, home to more than 90 species of butterflies, beautifully showcases nature's resilience within this thriving ecosystem.







Empowering livelihoods is a key pillar of Tata Chemicals' community development vision. In partnership with the Light of Life Trust, the company has established a Skill and Livelihood Training Centre in Mulshi, designed to equip individuals with practical skills for diverse careers to enhance employability and self-reliance. The centre equips individuals with hands-on skills for diverse careers and disciplines, including AC Technicians, Electricians, Computer Literacy, Beauty Care, Spoken English, Mehndi Design, and Job Readiness.

With an ambition to skill 2,000 individuals over four years, the initiative serves as a catalyst for opportunity, empowerment, and community development. Tata Chemicals also supports the Aniket Bhavi Sevabhavi Sanstha, fostering inclusivity and supporting children with mental disabilities.



A Community Transformed

In the Ambarvet village of Pune district, Tata Chemicals supports the Tribal Katkari community, which primarily relies on agriculture, brick kilns, and fishing. The company's initiatives have enabled 100% Aadhaar enrolment and improved access to water, sanitation, healthcare, and food security during the COVID-19 pandemic. Continued support to the local Adivasi school through essential learning and hygiene materials is helping build a healthier, more secure future for its students.



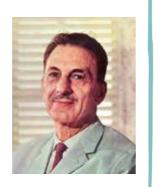


Following their Footsteps

"

J. R. D. Tata

"More than ever before, we must be ready to think every problem afresh, to change and innovate every time it pays to do so; to be ever alert to every opportunity to export and to substitute imports; to test and adopt every new idea, method, process or equipment which can increase our efficiency and reduce our costs. We must bring trained young minds to bear on new problems and not cling to outmoded ideas and methods because they worked well in our grandfathers' time."



"



Ratan Tata

"What would really make me happy is to have people say that we are a Group that provides value for money and that our customer sensitivity is very high. In other words, I have no desire to strive to necessarily be No. 1 in size. But being No. 1 in quality and No. 1 as a corporation in its human and business practices would be really great."



Epilogue

From the people who create to the customers who benefit, innovation is the thread that weaves through every aspect at Tata Chemicals. For over two decades, researchers and scientists at the Innovation Centre have worked towards solutions that address real-world challenges while remaining committed to responsible innovation and environmental stewardship.

Preparing for a brighter future, the focus remains on harnessing advancements in Renewable Energy, Green Chemistry, and Artificial Intelligence. These advancements are set to revolutionise the development of eco-friendly products, particularly in the agri-solutions business.

As Tata Chemicals continues to explore new frontiers, each breakthrough brings us closer to a more resilient and future-ready world.

Tata Chemicals: Innovating Today, Transforming Tomorrow.



"Our mission serves as the bedrock for our relentless focus on innovation, differentiation, and excellence—shaping solutions that serve society through sustainable growth. I hope your visit to the Innovation Centre is inspiring and memorable"

Dr. Richard LoboHead of Innovation, R&D
Business Excellence
Chief Ethics Counsellor





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