Abdel is a passionate leader with a blend of scientific and commercial skills. He brings over 20 years of experience in the biotech, pharma and CDMO sectors, spanning Europe, North America, and Asia. Abdel heads Lupin's API CDMO business, a division that provides custom development and manufacturing of active pharmaceutical ingredients for clients worldwide.

DR ABDELAZIZ TOUMI

Chief Executive Officer
Lupin Manufacturing Solutions

"Integration of AI & ML to play a critical role in reshaping pharma manufacturing operations"

In an exclusive interview, Dr Abdelaziz Toumi, CEO, Lupin Manufacturing Solutions shares his views on the latest technological trends in pharma manufacturing and company's initiatives to adopt digital and sustainability

By **Rahul Koul**

How does Lupin Manufacturing Solutions (LMS) ensure the highest standards of quality and reliability across its manufacturing processes? Any recent technological advancements adopted by you?

LMS upholds the highest standards of quality and reliability in its manufacturing processes by combining rigorous quality control measures, advanced technology, and a commitment to continuous improvement. In terms of rigorous Quality Control Systems, LMS adheres to internationally recognized quality standards, incorporating regular quality audits, inspections, and testing through every stage of the manufacturing process. There are multiple testing phases, from raw material procurement to final product inspection, ensuring each step meets stringent quality criteria.

In terms of Supplier Quality Management, we are ensuring supplier compliance with LMS's quality

standards is essential. The company implements a Supplier Quality Assurance (SQA) program, encompassing regular audits, material inspections, and performance evaluations to ensure quality. In terms of Employee Training and Engagement, LMS invests in ongoing training programs to ensure employees are up-to-date with the latest manufacturing practices and quality management techniques.

LMS is also actively pursuing several digital transformation initiatives to drive continuous improvement. In terms of Internet of Things (IoT) and Smart Manufacturing, IoT-enabled devices provide real-time data on machine performance, environmental conditions, and production status. This data supports predictive maintenance, reducing downtime and enhancing reliability.

In terms of Cloud Computing and Data Analytics, cloud-based platforms enable real-time production monitoring, fostering better collaboration and informed decision-making. Data analytics tools analyze production and quality trends, facilitating continuous improvement by identifying areas for optimization.

"We have set ambitious science-based targets to reduce greenhouse gas emissions by 2030."

There is an increasing trend of outsourcing manufacturing operations in the pharma industry. How do you look at the growth potential of CDMO and CRDMO markets in India?

India's CDMO market is at an inflection point, projected to grow significantly, driven by shifts in global supply chains and strategic realignments. Bain predicts a rise in India's CDMO market share by over 6% until 2026, underscoring the potential of Indian CDMOs to become reliable partners in global drug development. With the BioSecure Act in the U.S., India is emerging as a preferred partner, offering competitive advantages in quality, cost, and reliability over other regions. Established pharma CDMO players in India, including Lupin Manufacturing Solutions (LMS), are stepping up to meet this demand.

How LMS plans to capitalize on India's manufacturing strengths to deliver reliable, cost-effective solutions for pharmaceutical partners?

LMS operates two state-of-the-art manufacturing sites in Dabhasa and Vizag. Our sites are inspected and

approved by major regulatory agencies, including the U.S. FDA, WHO, EMEA, and TGA. Also, an important part of LMS is a modern research facility in Pune that hosts top scientists, along with world-class technologies and equipment. This unique combination of research, clinical and commercial assets, provide a cost-effective solution for pharmaceutical partners. Our solutions can cater to the needs of every partner – right from small startup pharma companies to mid-sized and large corporations. We have also established our commercial teams in the U.S. and EU – close to our partners. This allows us to deliver the best support to our partners – by working closely with them to accelerate their journey toward fulfilling patients' needs and enabling greater outcomes.

How is LMS leveraging Industry 4.0 technologies to modernize its manufacturing operations?

Data plays an important role in research and manufacturing operations. It is the foundation for discovery and continuous improvement. We have automated ERP systems in our factories for decades now. From predicting customer demand, procuring raw materials in-time and ensuring continuous, cost-effective operations with optimized inventories, our operations is guided by modern data-driven tools. The next level of maturity towards Industry 4.0 is leveraging online data for monitoring and control, using data and AI to recognize patterns before an issue arises, supporting operations in data mining, and preventing issues before they occur. Also, the level of automation and digitization will increase over time to reduce repetitive work and increase consistency.

Sustainability is a key focus for the pharmaceutical industry. How is LMS contributing to green manufacturing practices?

At Lupin Manufacturing Solutions (LMS), sustainability is not just an initiative—it is embedded in our operations. We have adopted several

green manufacturing practices to reduce our environmental footprint. For instance, LMS uses biomass briquettes as a fuel alternative to traditional fossil fuels. Our processes are designed to minimize waste by recycling solvents and packaging materials and optimizing manufacturing steps to improve efficiency. We are also committed to water conservation through optimized usage and recycling.

At Lupin, we are committed to building a future that prioritizes both healthcare outcomes and environmental stewardship. As part of our comprehensive climate strategy, we have set ambitious Science-Based Targets to reduce greenhouse gas emissions by 2030. Our initiatives include renewable energy procurement, such as solar and wind power, and adopting low-carbon technologies across our operations.

"India's CDMO market is at an inflection point, projected to grow significantly, driven by shifts in global supply chains and strategic realignments."

How do you see the pharmaceutical manufacturing landscape evolving in the next five years, and what role will LMS play?

The pharmaceutical manufacturing landscape is undergoing a transformative shift, driven by advancements in digital technologies, sustainability imperatives, and the need for increased agility in responding to global health challenges. Over the next few years, the integration of Artificial Intelligence (AI) and Machine Learning (ML) will play a critical role in reshaping manufacturing operations. AI tools can analyze vast volumes of data generated across processes, enabling predictive maintenance, trend analysis, golden profiling, and real-time quality monitoring. At LMS, we are leveraging these tools to achieve operational consistency and deliver high-quality products to customers worldwide.

Are there any emerging trends or technologies you are particularly excited about for the future of manufacturing?

Emerging technologies such as Continuous Manufacturing and advanced automation are also set to redefine efficiency and scalability in production. LMS has already embraced

Continuous Flow Reactor technology, which not only enhances process precision but also significantly reduces resource consumption. Sustainability-focused innovations, such as enzymatic processes and aqueous fermentation methods, will further strengthen LMS's role as a pioneer in green manufacturing.

LMS operates in a highly globalized market. How do you address the challenges of maintaining consistency and balancing local customization with global standardization?

Operating in a globalized market requires a fine balance between adhering to rigorous global standards and meeting the specific needs of local markets. At LMS, we address these challenges through a robust framework of process standardization combined with strategic flexibility. By deploying advanced Continuous Improvement Programs, we consistently enhance our operational efficiencies, capacity utilization, and equipment effectiveness, ensuring our competitiveness on a global scale.

Simultaneously, we understand the importance of local customization in a diverse global market. Our approach includes sourcing materials sustainably from local suppliers, when possible, and adapting packaging and regulatory compliance to meet local requirements while staying aligned with international standards. This dual focus enables us to deliver consistent, high-quality products globally while remaining responsive to the needs of local markets.