

## Expert Opinion - Piyush Palkhiwala

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### Trends in industrial biotech sector

The market requires additional development before it can create a centralized presence and witness stable growth.

Biotechnology, during the last two decades, has emerged as a technological revolution around the world. The range of enzyme application sectors has now become large and is continuously increasing. It has influenced almost every sector of industrial activity - chemical feedstock, food, feed, environment, energy and healthcare. In general, commercial applications of biotechnology developments are directly driven by social and environmental needs, besides economic forces.

The trend for enzyme application in almost every sector is on increase. Based on the knowledge of the behavior of enzymes, a number of unfavorable perceptions associated with the use of enzymes as industrial catalysts have been overcome, leading to the emergence of many new application areas.

Industrial production of enzymes requires a clear understanding of the associated scientific and technological issues. These issues range from identification of the biological sources for enzyme production to their genetic manipulation for overproduction, strategies for cell cultivation, isolation, purification and stabilization.

Biotechnology is a powerful enabling technology that can transform agriculture and healthcare, use renewable resources to bring greater efficiency into industrial processes, check environmental degradation and deliver a more bio-based economy.

Though there is a prevailing domestic demand, the segment is largely export driven. Major export markets include the US (global share of 40 percent), Europe (global share, 25 percent), China (global share, 20 percent). Others include rest of Asia (global share of 15 percent). Realizing the potential of the opportunities outside India, many Indian companies are expanding their presence even into difficult markets such as China. The biotech industry in India accounts for just two percent of global biotech markets. But it is gaining global visibility recently mainly because of the investment opportunities.

It is difficult to strategize the Indian industrial enzymes market because it is at various stages of growth, ranging from penetration to product development. For instance, the pharmaceutical enzymes segment is relatively nascent and is the focus of a small group of specialized manufacturers. Meanwhile, the textile and leather enzymes segments are mature, while the detergent enzymes segment is in the growth stage.

Product development and diversification into new end-application within the industry is a viable strategy to sustain revenue growth in this dynamic market. Manufacturers need to maintain focus on key purchasing criteria such as the high product standards, while simultaneously decreasing the cost of production and retaining customers.

Most of the ongoing enzyme production facilities in the country use conventional technologies and have not adopted the recent developments. Although a large number of academic institutions and universities are involved in basic research in enzymology, applied R&D and process engineering activities have been lagging behind.

Creation of multidisciplinary R&D groups to trace up application oriented research on enzymes can lead to the desired goals. Further since the resources are scarce, networking and strengthening of capabilities available in existing institutions and universities should be given priority. This will significantly enhance the core compliance.

It is problematic to switch from chemicals to biotechnology in India as it lacks infrastructure. That's the reason behind total enzyme consumption figures of India has been comparatively low.

A large quantity of raw materials and trained manpower is available in the country that can sustain the growth of enzyme based industry. However, intensive efforts are needed for the development of process technology through well planned reoriented R&D activities. Capabilities in bioprocess engineering of technologies also need strengthening.

The economic and environmental benefits of use of industrial enzymes will not be realized without some positive actions. Special efforts are needed to formulate favorable government policies to promote academic-industry interaction. Well documented and foolproof guidelines on bio-safety and intellectual property rights are not available with the Department of biotechnology, GOI and other international agencies.

Industrial enzymes have played a significant role in today's commercial status of biotechnology in India. The future will witness more and novel applications of microbial enzymes in far greater areas than what we could anticipate today.

- **Piyush Palkhiwala**, chairman and managing director, Maps Enzymes