

FROST & SULLIVAN

*ITACONIX PLC.*

**2022**  
**ENABLING**  
**TECHNOLOGY**  
**LEADER**

*NORTH AMERICAN*  
*BIO-BASED POLYMER INDUSTRY*

## Best Practices Criteria for World-Class Performance

Frost & Sullivan applies a rigorous analytical process to evaluate multiple nominees for each award category before determining the final award recipient. The process involves a detailed evaluation of best practices criteria across two dimensions for each nominated company. Itaconix plc. excels in many of the criteria in the bio-based polymer space.

AWARD CRITERIA	
<i>Technology Leverage</i>	<i>Customer Impact</i>
Commitment to Innovation	Price/Performance Value
Commitment to Creativity	Customer Purchase Experience
Stage Gate Efficiency	Customer Ownership Experience
Commercialization Success	Customer Service Experience
Application Diversity	Brand Equity

### *Enabling Sustainability through Pioneering Innovation*

For decades, polymers featuring itaconic acid in small percentages have been widely available in various commercial applications, including resins for papermaking and carpet backing. However, manufacturers cannot solve the puzzle of making polymers with greater than fifty percent (50%) itaconic acid to harness itaconic acid’s full potential due to its poor production economics from the complex polymerization process. Consequently, fossil-based alternatives, such as styrene and acrylates, remain enterprises’ preferred platform chemicals despite itaconic acid polymers’ functional and environmental benefits. Nevertheless, Frost & Sullivan’s independent research reports that while most polymers dominating industries such as personal care are of synthetic origin, strict government regulations are pushing manufacturers to shift their focus toward bio-based or renewable and naturally sourced ingredients<sup>1</sup>. Moreover, businesses across various market segments experience additional pressure from consumers worldwide, who increasingly demand sustainable products but are unwilling to compromise on costs or performance. In this convoluted landscape, Itaconix plc. (Itaconix)’s innovative itaconic acid polymerization technology and manufacturing process enable companies to increase their sustainability cost-effectively while improving their products’ performance.

Founded in 2008 and headquartered in Stratham, New Hampshire, Itaconix is a provider of sustainable specialty chemical ingredients for personal care, home care, and industrial applications. Backed by world-class subject matter experts and driven by its vision of decarbonizing everyday consumer products, the

<sup>1</sup> *Growth Opportunities for Polymers in Personal Care* (Frost & Sullivan, December 2020)

company developed a pioneering proprietary process for itaconic acid polymer production that achieves a 95% yield in less than an hour. This technical breakthrough enables Itaconix to manufacture bio-based ingredients that emulate fossil-based acrylic acid polymers' active properties at lower or equivalent costs. Hence, it offers businesses a commercially viable pathway to reduce their formulations' carbon footprint,

*"Itaconix's fundamental innovation has allowed it to assemble a specialized proprietary production line requiring low capital equipment expenditure, which it leverages to deliver optimal costs and go-to-market times that competitors cannot replicate."*

**- Amit Rawat,  
Senior Research Analyst:  
TechVision, Chemicals  
and Materials**

meeting consumers' rising demand for sustainable products and complying with increasingly stringent regulations while upholding performance standards.

The company's main value proposition lies in its patented technology's unmatched manufacturing capabilities combined with a capacity to identify impactful applications for its bio-based polymers. Itaconix's fundamental innovation allowed it to assemble a specialized proprietary production line requiring low capital equipment expenditure, which it leverages to deliver optimal costs and go-to-market times that competitors cannot replicate. In parallel, the company follows a product development roadmap structured in five

steps: discovery, concept, prototype, first sales, and growth. Throughout the process, a team of prominent scientists comprising chemical engineers and specialized polymer chemists oversees the development and rigorous application testing of Itaconix's plant-based chemistries to ensure their health and environmental safety along with their cost performance in targeted customer solutions. In addition, the company incorporates client feedback combined with industry trend monitoring to guide its product development strategies. Furthermore, it fosters a culture of innovation and creativity to spark novel breakthroughs, drive continuous improvements, and actualize its forward-looking corporate vision.

### **Stage-Gate Efficiency Drives Commercial Success**

With its foundational technology in place, the company developed a comprehensive portfolio of patented products purpose-built to bridge industry gaps and a structured stage gate process to bring them to

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**- Juan Ouviaña Lanz,  
Best Practices Research Analyst**

market successfully. Itaconix understands that performance and cost-effectiveness remain the primary drivers for consumer product manufacturers. Thus, it strives to identify use cases in which its chemistries can generate maximum impact and experience rapid commercialization. Through this focused approach, it continuously designs and delivers impactful solutions that address unmet market needs and create substantial value, inciting businesses to substitute fossil-

derived polymers for the company's biobased alternatives to boost performance, reduce costs, improve efficiency, and enhance safety.

With each offering, Itaconix first enters a proof of value stage, targeting enterprises that seek to develop more sustainable products but struggle to achieve this while remaining competitive. Once

commercialized, an emerging product featuring the company's performance-enhancing ingredients gradually gains traction, drawing attention from competitors and creating opportunities for Itaconix to increase its market share in that space. For instance, the company's low-cost solution for non-phosphate automatic dishwashing detergents delivers improved shine and reduced glass and metal corrosion. Further, its enhanced multi-functionality enables the production of more compact tablets and pods by eliminating the need for non-essential elements. This efficiency breakthrough sets a new standard that helps steer the industry toward reducing greenhouse gas emissions and chemical waste with each product's iterative use.

Itaconix experienced high commercial success in the North American dishwashing powder space. As of 2022, it has worked with leading brands, including Clorox and Colgate-Palmolive, and a range of private-label and green brands. Moreover, by combining its technological edge, industry know-how, and effective market penetration strategies, the company capitalizes on itaconic acid's broad application diversity to commercialize its ingredients in various product classes within the cleaning, hygiene, and beauty segments. As a result, its growing market share amounted to featuring in 130 different brands' formulations by mid-2022<sup>2</sup>, a remarkable achievement positioning Itaconix ingredients in most supermarkets in North America and an increasing number of European establishments. Having attained 40% compound annual growth between 2018 and 2022, Frost & Sullivan believes Itaconix is well-positioned to sustain this trajectory in the coming years by capturing additional market share and developing new valuable use cases for its plant-based chemistries.

## Conclusion

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Faced with increasingly stringent government regulations and rising demand for sustainable and naturally sourced goods, consumer product manufacturers in the personal care, home care, and industrial segments struggle to find the right solutions to adapt their offerings accordingly while maintaining performance standards and competitive prices. Through its pioneering proprietary process for itaconic acid polymer production, Itaconix plc. (Itaconix) offers businesses a sustainable option to minimize their carbon footprint while benefiting from enhanced functionalities. The company supports its innovative edge with a structured stage gate process, continuously identifying business opportunities in high-value applications where its chemistries address unmet market needs. Through this approach, Itaconix enables significant gains for its customers while securing a competitive advantage that, in turn, gradually leads to its ingredients' increased adoption within the targeted space. With its ingredients featuring in over 130 brands' formulations as of 2022, the company's impressive market penetration evidences its commercial strategy's success. Furthermore, its technologies' broad application diversity positions it for sustained growth in various industry verticals for years to come.

With its strong overall performance, Itaconix plc. earns Frost & Sullivan's 2022 North American Enabling Technology Leadership Award in the bio-based polymer industry.

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<sup>2</sup> [https://itaconix.com/wp-content/uploads/22-06-08-Itaconix\\_Preliminary-announcement-FY21-year-end-FINAL.pdf](https://itaconix.com/wp-content/uploads/22-06-08-Itaconix_Preliminary-announcement-FY21-year-end-FINAL.pdf), accessed September 2022

## What You Need to Know about the Enabling Technology Leadership Recognition

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Frost & Sullivan's Enabling Technology Leadership Award recognizes the company that applies its technology in new ways to improve existing products and services and elevate the customer experience.

### Best Practices Award Analysis

For the Enabling Technology Leadership Award, Frost & Sullivan analysts independently evaluated the criteria listed below.

#### *Technology Leverage*

**Commitment to Innovation:** Continuous emerging technology adoption and creation enables new product development and enhances product performance

**Commitment to Creativity:** Company leverages technology advancements to push the limits of form and function in the pursuit of white space innovation

**Stage Gate Efficiency:** Technology adoption enhances the stage gate process for launching new products and solutions

**Commercialization Success:** Company displays a proven track record of taking new technologies to market with a high success rate

**Application Diversity:** Company develops and/or integrates technology that serves multiple applications and multiple environments

#### *Customer Impact*

**Price/Performance Value:** Products or services provide the best value for the price compared to similar market offerings

**Customer Purchase Experience:** Quality of the purchase experience assures customers that they are buying the optimal solution for addressing their unique needs and constraints

**Customer Ownership Experience:** Customers proudly own the company's product or service and have a positive experience throughout the life of the product or service

**Customer Service Experience:** Customer service is accessible, fast, stress-free, and high quality

**Brand Equity:** Customers perceive the brand positively and exhibit high brand loyalty

## About Frost & Sullivan

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### Key Impacts:

- **Growth Pipeline:** Continuous Flow of Growth Opportunities
- **Growth Strategies:** Proven Best Practices
- **Innovation Culture:** Optimized Customer Experience
- **ROI & Margin:** Implementation Excellence
- **Transformational Growth:** Industry Leadership



## The Innovation Generator™

Our 6 analytical perspectives are crucial in capturing the broadest range of innovative growth opportunities, most of which occur at the points of these perspectives.

### Analytical Perspectives:

- **Mega Trend (MT)**
- **Business Model (BM)**
- **Technology (TE)**
- **Industries (IN)**
- **Customer (CU)**
- **Geographies (GE)**

