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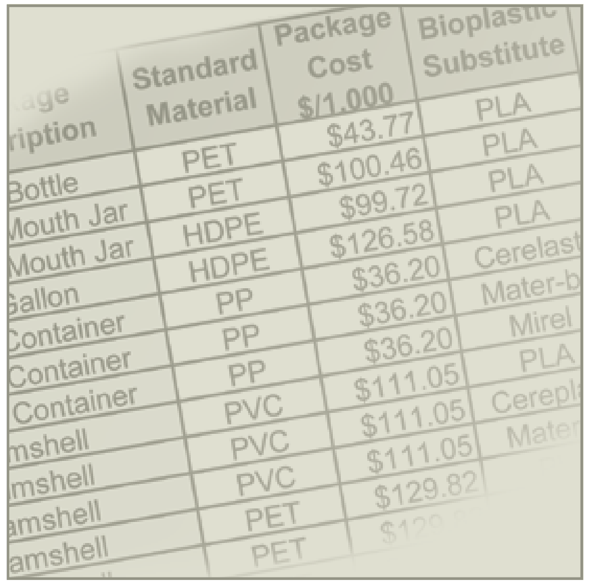
Biopolymers for Commodity Packaging

A Comparative Cost/Performance Benchmarking Study & Executive Guide To Packaging Biopolymer Providers, Capacity, & Market Positioning



Source: Plastex Solutions, LLC.

This Unique, Ultra-timely Report Is Actually 3 Reports In 1

1 The ultimate overview of the most significant biopolymer technologies, the market drivers behind them, and the economic and performance factors that will limit their growth and applications vs. traditional plastics in commodity packaging

2 17 fully developed package manufacturing cost assessment models, comparing 5 "standard" plastics against 5 biopolymers across 7 unique package formats and 7 plastics processing technologies

3 Bold, definitive conclusions that explain exactly why huge investments in biopolymer R&D and commodity applications will move forward despite the lack of positive cost/performance indicators compared to petroleum-based polymers

This report is illustrated with more than 80 originally researched and developed comparative cost differential and cost-per-thousand manufacturing models

Biopolymers for Commodity Packaging

This is the ultimate cross-functional competitive intelligence resource.

It has been logically divided so that entire teams – from the board room to business development to strategic planning to purchasing to manufacturing to marketing, and beyond – all have a clear understanding of what it means to their department, function, and role in making the best cost-performance decisions.

Section 1 **objectively examines**

the large and rapidly evolving bioplastic landscape, defines terms, identifies the dominant bioplastic technologies, summarizes alternative manufacturing technologies, outlines dominant and emerging players and the technologies, capacities, and market positions they hold. This Section presents an executive primer that will enable chief executives to grasp and coherently address key issues and understand "who's doing what" in the global biopolymer segment and why the technologies and companies are garnering headlines in *USA TODAY, U.S. News & World Reports, Time, Fast Company,* and *The Wall Street Journal.*

Who Must Read This Section of the Report

- Top executives who must be aware of the top players and emerging underdogs, and who need a deeper understanding of the business dynamics driving this new segment
- Financials analysts who watch, report, and make recommendations and forecasts to investors and technology acquirers and licensees
- Brand owners with an immediate need to raise the environmental profile of their packaging and still make cost-conscious plastics packaging selection decisions
- Converting executives tasked with delivering cost-effective packaging solutions to brand owners
- Retailers who are now firmly in the packaging material specifications driver's seat

Section 2 **focuses on packaging biopolymers.**

It is where the authors comprehensively consider which of the many bioplastics now in development are most likely to replace traditional polymers in the production of commodity packaging. It is in Section 2 that the current state of the primary market for packaging biopolymers – including advantages and disadvantages – is revealed using both direct text and illustrated with more than 80 comparative cost differential and cost-per-thousand manufacturing models.

Most significantly, Section 2 addresses the critical and typically misunderstood non-packaging issues impacting packaging biopolymers, including:

- The impact on, and push-back from, the recycling community, which sees packaging biopolymers only in terms of contamination potential of existing recycling streams
- The disruption of agricultural resources resulting from the growing diversion of biosource materials to non-food applications
- How decisions you make will impact your bottom line

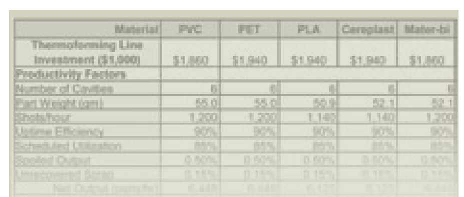
Who Must Read This Section of the Report

- R&D leaders tasked with providing decision-quality information on plastic packaging costs and performance to those making marketing and purchasing decisions
- Manufacturing/Plant Managers who must understand the performance limitations of an entirely new genre of packaging materials
- Brand managers seeking quantifiable data on biopolymers available commercially today and what's in the pipeline
- Food processors responsible for delivering foods, beverages, and other fast-moving goods to market in a socially, environmentally, and economically responsible way

Sections 3 and 4 **deliver astounding and never-before-defined or analyzed conclusions**

based on the economic and non-economic issues of the use of biopolymers in packaging by comparing the full cost of biopolymer package manufacturing vs. "traditional" plastic package manufacturing. In this section it is revealed in painstaking detail why, in nearly every case presented, the use of biopolymers cannot be cost/performance justified.

And finally, readers will learn why biopolymer development and applications for commodity packaging will continue, and even grow, despite the overwhelming evidence of negative cost/performance equations.



Material	PVC	PET	PLA	Cereplast	Mater-bi
Thermoforming Line Investment ($1,000)	$1,860	$1,940	$1,940	$1,940	$1,860
Productivity Factors					
Number of Cavities	6	6	6	6	6
Part Weight (gm)	55.0	55.0	56.9	52.1	52.1
Shots/hour	1,200	1,200	1,140	1,140	1,200
Uptime Efficiency	90%	90%	90%	90%	90%
Scheduled Utilization	85%	85%	85%	85%	85%
Spoiled Output	0.50%	0.50%	0.50%	0.50%	0.50%
Unrecovered Scrap	0.15%	0.15%	0.15%	0.15%	0.15%
Net Output (parts/hr)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Annual Output (1,000)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Who Must Read This Section of the Report

- VPs of Manufacturing responsible for minimizing direct costs, maximizing throughput, and ensuring the lowest total cost of ownership on manufacturing processes and manufactured products
- Business planners and strategists who make forecasts, hedge purchases, and who must have an intimate knowledge of the current and future landscape for biopolymers for commodity packaging applications.

Rigid & Flexible Package Manufacturing Processes Comparatively Evaluated:

- Thermoforming
- Injection Stretch Blow Molding
- Injection Molding
- Extrusion Blow Molding
- Foamed Parts
- Biaxially Oriented Film
- Blown Film

7 Package Types Comparatively Evaluated:

- 500 ml water bottles • 16 oz wide-mouth jars
- Half-gallon jugs • 370 ml deli tubs
- Clamshells • Trays • Thin-wall grocery bags

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PLUS: This report is illustrated with more than 80 originally researched and developed comparative cost differential and cost-per-thousand manufacturing models

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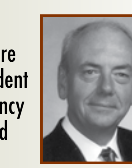
About the Authors

Gordon Bockner founded the packaging consultancy Business Development Associates, Inc. (BDA) 1981 following an 11-year career at Continental Can Co. He has assisted clients in the development and implementation of technology licensing strategies and continues to monitor technology and market developments in the packaging industry with a primary focus on rigid plastics. BDA's client list includes large and small packaging companies in the United States, Europe, and the Far East.

This is the latest in the unique series of best-selling multi-client studies authored by BDA since 1994 dealing with the technology, product, and market developments of PET food and beverage packaging. His multi-client report credits include the *Beer in PET series; Aseptic vs. Hot-fill for PET; Barrier-Enhancing Technologies for PET & Polypropylene Containers & Closures; Polypropylene and HDPE Challenge PET Blow molded Containers.*

Dr. Jim Lunt has spent more than 40 years in the plastics industry in Europe, North America, and Asia. For the past 16 years he has been actively involved in the emerging biopolymers industry sector, and is a founding member of NatureWorks LLC., which developed and commercialized the first melt-processable, renewable resource-based polymer referred to as polylactide (PLA).

Dr. Lunt has co-authored numerous publications and has been an invited speaker at conferences worldwide. He is a recipient of the 2002 Presidential Green Chemistry Award. He is the co-inventor on more than 20 patents involving performance polymers and chemistry solutions in new and emerging applications.



Robert Tremblay's career in the plastic packaging industry spans more than 30 years. He is currently president of Plastex Solutions, LLC, a consultancy for clients that include producers and purchasers of plastic resin, molding machinery, and packaging. Previously, Tremblay was president of Western Container Corp., the primary producer of PET containers for the Coca-Cola bottling system in the western United States and Canada. Prior to leading Western Container, he was vice president of quality assurance and vice president of operations at Constar International.

Tremblay is the author of the multi-client study *PET Beverage Packaging Barrier Technologies,* published by Packaging Strategies.