BIO-BASED PRODUCTION OF UNSATURATED POLYESTER RESINS

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C4-C6 chemicals: An avenue for bio-based processes

Index for Ethylene Production by Naphtha Cracking in the U.S.

Shortfalls In C4-C6 Building Blocks

AFPM producer data
Unsaturated Polyester Resins (UPR): $10 billion market opportunity
URP formulators desperately need a stable, low-cost and eco-friendly alternative.

- Volatile Prices
- Shale-gas Disruption
- UPR market
- Low Profit Margins
- Demand for Sustainable Products

Refinery → Specialty chemicals → UPR formulator → Industrial Manuf.
Visolis’ Ecolate: A new range of building blocks for UPRs

Conventional Petroleum Monomers

Visolis’ Proprietary Monomers

Unsaturated Polyester Resin
Visolis uses synthetic biology to create a green and cost-effective solution.

**Feedstock**
- Sugars (corn/cane), glycerol, syn-gas

**Conversion**
- High Yield Fermentation using engineered microbes

**Synthesis**
- Simple conversion and separation to building blocks

**Purification**
- Remove residual sugars, esters, alcohols and water

- **low volatile feedstock**
- **Unique Value IP**
- **Simpler**
- **Cheaper**
Visolis’ core competencies

Microbe Engineering

Polymerization

Catalysis
Proof-of-concept to pilot in 6 months

Research

- 500ml Lab Scale
- 5L Scale

- Yield
- Titer
- Productivity

Scale-up to Commercial Production

2015
- 300L Pilot Scale
  - on-going

2016-18
- Demo-scale

2019
- Commercial Production

✓ Economic & market validation
✓ Corporate partnership

Process validation
Capital-light model: creating value across the supply chain through partnerships

Visolis
Platform technology provider

Joint Ventures

Service Providers

EPC

End Consumers

Long-term off-take agreements
Visolis is a platform technology with numerous opportunities.
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