

The Global Market for Bio- and CO₂- based Plastics and Polymers

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Abstracts

Bio-based polymers are sustainable polymers synthesized from renewable resources such as biomass (e.g. plant waste, algae) rather than conventional petroleum feedstocks such as oil and gas. They offer significant advantages over traditional plastic

CO₂ demonstrates the potential to be a renewable and inexhaustible platform chemical for the synthesis of commodities (methanol, urea, (in)organic carbonates, formic acid), fuel (methane, alkanes) and polymers. R&D is progressing to produce polymers and high-value chemicals utilising CO₂ as a feedstock. The technology transforms CO₂ into polycarbonates such as polypropylene carbonate (PPC) and polyethylene carbonate (PEC) using catalysts in a reaction with an epoxide, a chemical compound used as a reagent. Polymers and plastics generated utilising CO₂ include:

1. Polymers incorporating CO₂ directly into their structure, such as polycarbonates.
2. Polymers formed from monomers created by the hydrogenation of CO₂, such as ethylene and propylene.

A number of companies are currently operating polymer plants using CO₂ as a raw material. For the production of polymers, the utilization potential of CO₂ is estimated to be 10 to 50 Mt yr⁻¹ in 2050.

Report contents include:

Analysis of the Global Bio-based and Biodegradable Plastics and Polymers market.

Global production capacities, market demand and trends 2019-2033 for
Bio-based and Biodegradable Plastics and Polymers.

Analysis of bio-based feedstock chemicals including:

Bio-based adipic acid

11-Aminoundecanoic acid (11-AA)

1,4-Butanediol (1,4-BDO)

Dodecanedioic acid (DDDA)

Epichlorohydrin (ECH)

Ethylene

Furfural

5-Chloromethylfurfural (5-CMF)

5-Hydroxymethylfurfural (HMF)

2,5-Furandicarboxylic acid (2,5-FDCA)

Furandicarboxylic methyl ester (FDME)

Isosorbide

Itaconic acid

3-Hydroxypropionic acid (3-HP)

5 Hydroxymethyl furfural (HMF)

Lactic acid (D-LA)

Lactic acid – L-lactic acid (L-LA)

Lactide

Levogluosenone

Levulinic acid

Monoethylene glycol (MEG)

Monopropylene glycol (MPG)

Muconic acid

Naphtha

Pentamethylene diisocyanate

1,3-Propanediol (1,3-PDO)

Sebacic acid

Succinic acid (SA)

Analysis of synthetic Bio-based plastics and Polymers market including:

Polylactic acid (Bio-PLA)

Polyethylene terephthalate (Bio-PET)

Polytrimethylene terephthalate (Bio-PTT)

Polyethylene furanoate (Bio-PEF)

Polyamides (Bio-PA)

Poly(butylene adipate-co-terephthalate) (Bio-PBAT)

Polybutylene succinate (PBS) and copolymers, Polyethylene (Bio-PE),
Polypropylene (Bio-PP)

Analysis of naturally produced bio-based polymers including
Polyhydroxyalkanoates (PHA)

Polysaccharides

Microfibrillated cellulose (MFC)

Cellulose nanocrystals

Cellulose nanofibers,

Protein-based bioplastics

Algal and fungal based bioplastics and biopolymers.

Analysis of types of natural fibers including plant fibers, animal fibers including alternative leather, wool, silk fiber and down and polysaccharides.

Markets for natural fibers, including polymer composites, aerospace, automotive, construction & building, sports & leisure, textiles, consumer products and plastics & packaging.

The market for lignin-based plastics and polymers.

Production capacities of lignin producers.

In depth analysis of biorefinery lignin production.

Market segmentation analysis for bio-based plastics and polymers. Markets analysed include rigid & flexible packaging, consumer goods, automotive, building & construction, textiles, electronics, agriculture & horticulture.

Emerging technologies in synthetic and natural produced bio-based plastics and biopolymers.

492 company profiled including products and production capacities. Companies profiled include NatureWorks, Total Corbion, Danimer Scientific, Novamont,

Mitsubishi Chemicals, Indorama, Braskem, Avantium, Borealis, Cathay, Dupont, BASF, Arkema, DuPont, BASF, AMSilk GmbH, Notpla, Loliware, Bolt Threads, Ecovative, Bioform Technologies, Algal Bio, Kraig Biocraft Laboratories, Biotic Circular Technologies Ltd., Full Cycle Bioplastics, Stora Enso Oyj, Spiber, Traceless Materials GmbH, CJ Biomaterials, Natrify, Plastus, Humble Bee Bio and many more.

Analysis of the global market for carbon capture, utilization, and storage (CCUS) technologies.

Market developments, funding and investment in carbon capture, utilization, and storage (CCUS) 2020-2023.

Analysis of key market dynamics, trends, opportunities and factors influencing the global carbon, capture utilization & storage technologies market and its subsegments.

Latest developments in carbon capture, storage and utilization technologies

Market analysis of CO₂-derived plastics and polymer products.

Profiles of 30 companies in CO₂-derived polymer and plastics products producers. Companies profiled include Algal Bio Co., Ltd., C4X Technologies Inc., Carbonova, CarbonMeta Research, Chiyoda Corporation, CERT Systems, Inc., Covestro A.G., Mars Materials and Twelve.

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