



Biobased Industries and Biomaterials – Overview on innovative bio-chemicals

10 May 2023

The European Chemical Industry Council, AISBL - Belliard, 40 - 1040 Brussels - Belgium



Take home message

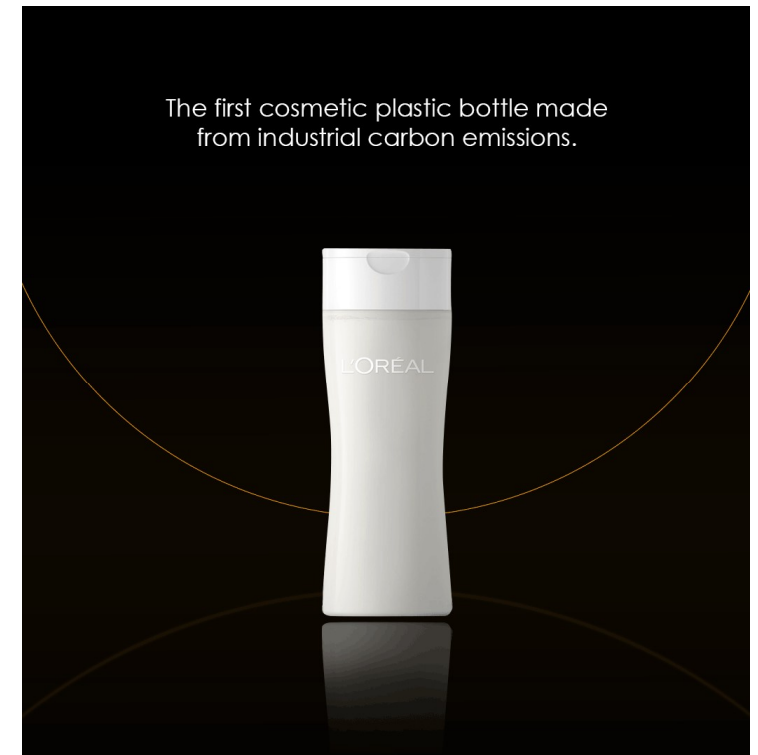
- The bioeconomy is happening here and now!
- Industrial biotechnologies are part of the key enabling technologies that need to be ramped up and recognised
- The global race is accelerating (e.g. Joe Biden Executive Order)
- Innovations of yesterday are today's businesses
- The 25 April AGRIFISH Council conclusions are a welcomed signal



Innovative bio-based chemicals in support of a climate-neutral circular economy

Biotechnology as enabler for the production of polyethylene (PE) from captured carbon (TRL 7)

- **Objective:** industrial production of PE from ethanol, obtained via a "biotech" process based on the bacterial fermentation industrial waste gas.
- **Product:** alternative to fossil fuel-based plastics, that is recyclable and emits less GHG (scope 1+2: $-0.44\text{tCO}_2/\text{t}$, scope 3: $-3.2\text{tCO}_2/\text{t}$)
- **Where:** pilot-plant in Belgium

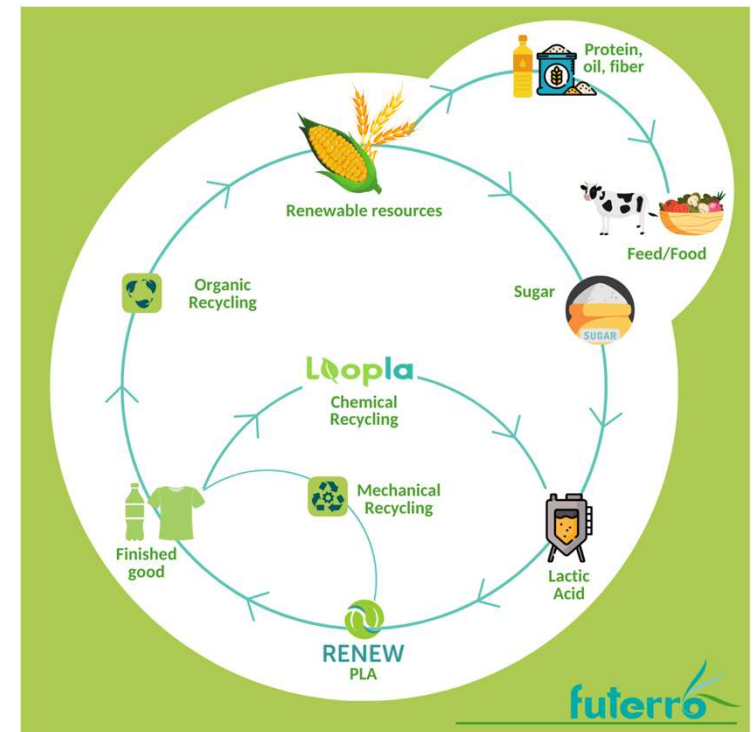


Source: TotalEnergies, LanzaTech, L'Oréal

Innovative bio-based chemicals in support of a climate-neutral circular economy

Bio-based, recyclable and low-carbon polymer

- **Objective:** provide a bio-based and recyclable polymer (PLA) that can replace fossil-based plastics for packaging, but also be used in other applications (insulation)
- **Product:** alternative to fossil fuel-based plastics, that is recyclable and emits less GHG (-75% compared to bottle-grade PET). Usable for all sorts of packaging (bottles, films, foamed packaging, transparent packaging ...)
- **Where:** production and recycling plant in France (new investment)

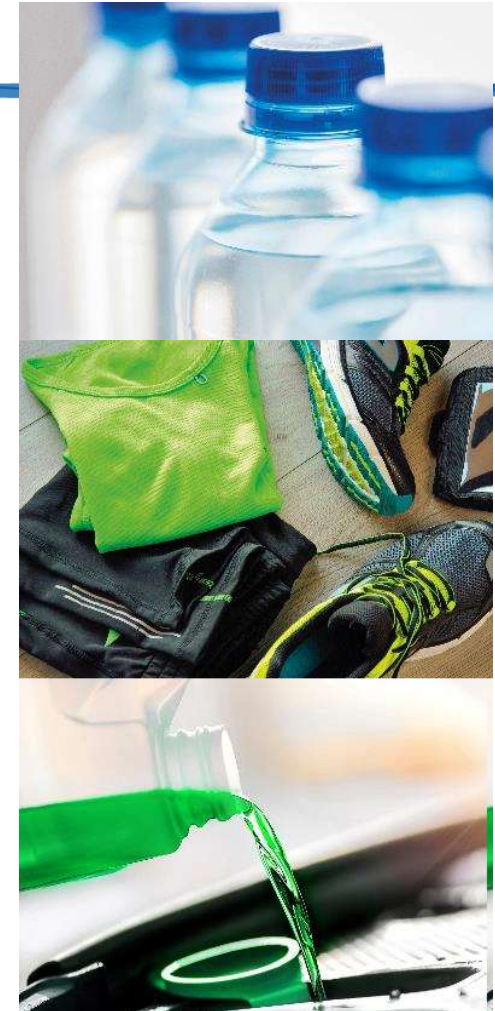


Source: Futerro

Innovative bio-based chemicals in support of a climate-neutral circular economy

Wood-based bio-mono-ethylene glycol (bio-MEG)

- **Objective**: meet a 30 mio tons/y market demand with a "drop-in" bio-based chemical for multiple applications
- **Product**: "drop-in" MEG for packaging, textile (polyester) and cooling applications with a 60% reduction in CO₂ compared to fossil alternatives
- **Where**: biorefinery in construction in Germany



Source: UPM

Innovative bio-based chemicals in support of a climate-neutral circular economy

Lignin-based solution for plant nutrition

- **Objective**: replace oil-based chemicals (such as chelating agents) in plant nutrition
- **Product**: improve sustainable food production by helping plants to grow healthy thanks to micro-nutrients (metals) "fixed" with bio-based lignosulfonic acid while reducing the CO₂ emission by 90%
- **Where**: biorefinery in Norway



Source: Borregaard

Innovative bio-based chemicals in support of a climate-neutral circular economy

Better adhesion with cellulose fibrils

- **Objective**: improve adhesion properties in manufacturing of corrugated board
- **Product**: cellulose fibrils (replacing borax) used in starch adhesives for stronger adhesion, reduced adhesive consumption, reduced waste and losses, reduced energy consumption in corrugators, etc. with a 21% CO₂ emission reduction.
- **Where**: biorefinery in Norway



Innovative bio-based chemicals in support of a climate-neutral circular economy

Polymers from fermented sugars

- **Objective:** regenerate local areas while delivering low-GHG bio-based products (carrier bags, fruits & vegetables bags, shoes, textile, car components, etc.) and meet a 2.5 million t/y market demand
- **Product:** bio-butanediol from sugars thanks to biotechnology (engineered e.coli bacteria) and fermentation. Bio-butanediol is used as solvent or in the production of plastics, elastic fibres and polyurethane. CO₂ savings are 50% compared to conventional BDO
- **Where:** upgraded decommissioned old factory in Italy



Innovative bio-based chemicals in support of a climate-neutral circular economy

Wood-based renewable functional fillers (RFF)

- **Objective:** meet a 14 mio tons/y market demand with a bio-based alternative to carbon black
- **Product:** a renewable functional filler that reduces the carbon footprint (up to 90%) of rubber used for thermoplastics, mechanical goods (sealing, flooring, etc.), automotive
- **Where:** biorefinery in construction in Germany



Source: UPM

Innovative bio-based chemicals in support of a climate-neutral circular economy

Rose scent for care and cosmetics

- **Objective**: provide bio-attributed rose scent aromas to the home and personal care industries
- **Product**: rose-scent drop-in solutions identical in quality and performance to the fossil-based counterparts. The aroma is readily biodegradable and comes with CO₂ savings of 30%. Feedstocks are waste-based biomethane and bionaphta.
- **Where**: Germany



Source: BASF

Thank you

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