



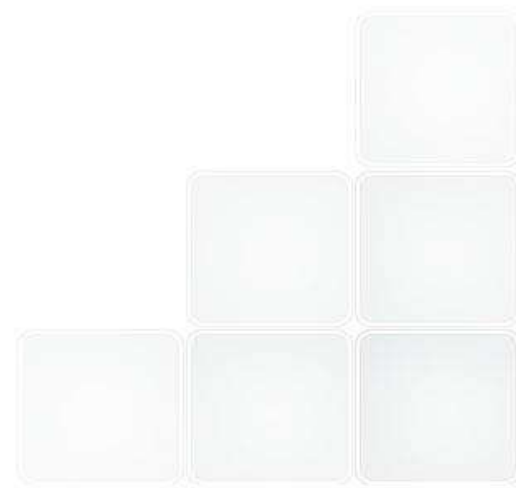
Current status of biorefineries in Italy

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IEA task meeting 2016
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INDUSTRIAL INITIATIVES



NOVAMONT's PROJECTS on biodegradable and compostable bioplastics



NEW NOVAMONT PLANT: Mater-Biotech

Biorefinery in Porto Torres



- ❑ New fermentation plant in the site of a previous plant (Adria) for the production of 1.4 butanediol from renewables
- ❑ Important partnership with Genomatica.
- ❑ Plant size: 30.000 ton/y



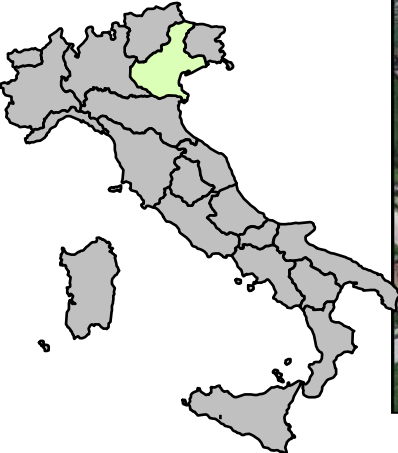
Plant start up in july 2016



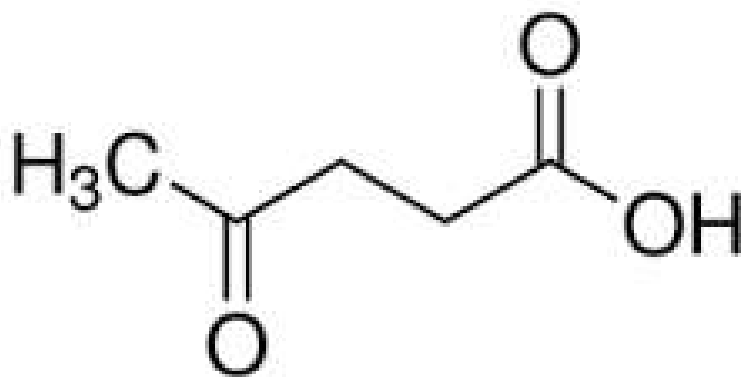
Matrica biorefinery
Joint venture for a biorefinery in Porto Torres (Sardinia)

7 plants with a total investment of 500 M€

The biorefinery will produce monomers (40kton/y) and lubricants (30kt/y)

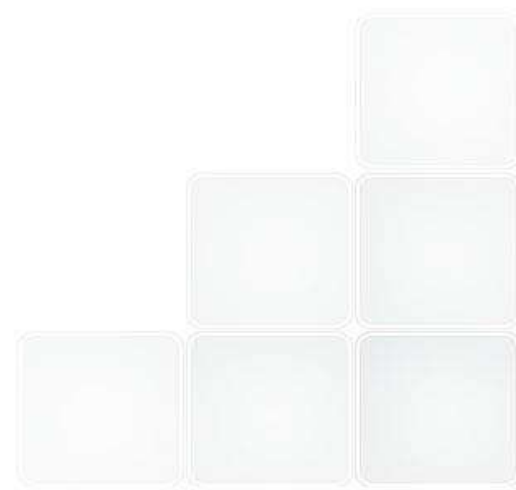


GF-BIOCHEMICALS: PRODUCTION OF LEVULINIC ACID



Biobased chemical company GF-Biochemicals has started in 2016 the commercial production at its 10,000 MT/a capacity levulinic acid plant in **Caserta**.

GF Biochemicals is the first company to produce levulinic acid at commercial scale directly from biomass.

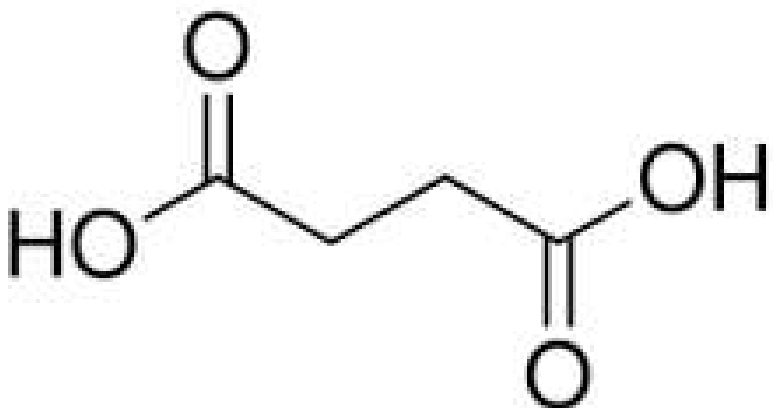




ENI-Versalis and Genomatica have advanced to pilot-scale the production of bio-butadiene (bio-BDE) from renewable feedstock to make bio-rubber, namely, bio-polybutadiene (bio-BR). “

The project started with the establishment of a technology joint venture between Versalis and Genomatica in early 2013.

Production of bio-succinic acid



Reverdia, the joint venture between DSM and Roquette Freres.

World's first bio-succinic acid plant (10 kton/y) through a yeast-based fermentation process in Cassano Spinola (Italy)

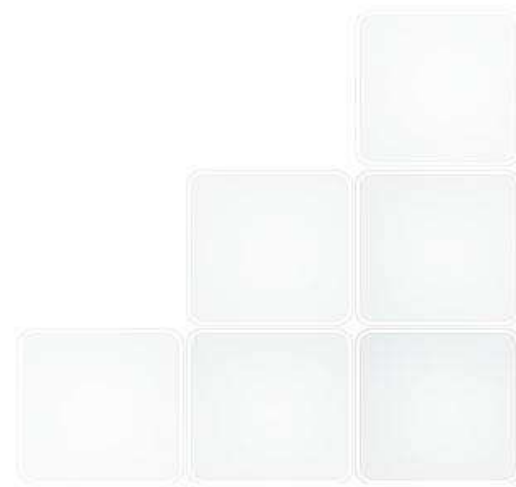
Beta Renewable



In India, Novozymes and Beta Renewables are working to establish a 75 million liter per year cellulosic ethanol plant using 3 million metric tons of paddy straw as feedstock.

- ✓ Beta renewables was funded in 2011
- ✓ In 2012 a partnership was created between Novozymes and Beta renewables .
- ✓ Long-standing collaboration has led to substantial reduction in cost of enzymes per unit of cellulosic ethanol
- ✓ Partnership of two industry leaders boosts confidence in the technology
- ✓ Guarantees on enzyme performance and cost incidence
- ✓ Parties are committed to ongoing improvements in enzymes and process
- ✓ Ensuring secure and most competitive enzyme supply to the customers

PUBLIC TO PRIVATE PARTNERSHIP (PPP)



PPP INITIATIVES ON THE GREEN CHEMISTRY



SPRING – Sustainable Processes and Resources for Innovation and National Growth

Biorefineries for the production of added value products (i.e. biochemicals and bioplastics)

Reconversion of industrial sites facing severe crisis

Use renewable raw materials including residues or dedicated sustainable crops

Establishment of public-private partnership in order to accelerate the industrialization of innovative technologies

4 initial R&D and demo projects, coordinated by the promoters companies

Industrial leaders: (Biochemtex (Tortona), Novamont (Novara) e Versalis (San Donato))

ENEA INVOLVMENT IN SPRING



Project ALBE

Leader Versalis:

- Sustainable technologies for the production of new **elastomeric materials** and lubricant oils



Project BIT3G

Leader Novamont

- "Third" generation biorefineries (OILS → **Bioplastics**, biolubricants, bioherbicides, etc)



Project REBIOCHEM

Leader Mater-Biotech:

- Chemicals from biomass (i.e. **BDO**, 5HMF)

<http://www.clusterspring.it/home-en/>

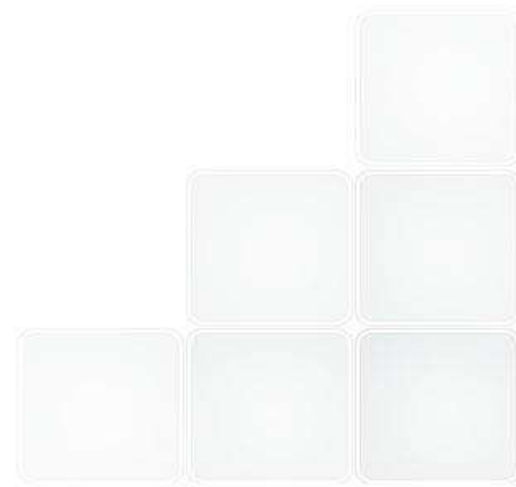
http://www.novamont.com/page.php?id_page=41&id_first=12&id_second=14

Regional Clusters on bioeconomy



- **LOMBARDY** Green Chemistry Association LGCA (Consorzio Italbiotec Innovhub, Stazioni Sperimentali per l'industria SSI, Politecnico di Milano, Università degli studi di Milano)

- **BASILICATA (SOUTHERN ITALY)** signed a MOU between several local research organizations and the Basilicata Region for the creation of an operative thematic group (GTO) on Bio economy. The group will follow the indications in the Smart Specialisation Strategy S3 for the Basilicata Region and will create the regional cluster on bio economy based on the establishment of local PPP.



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