Only about a third (30 Mt) of this was separately collected and composted and/or digested (European Compost Network (ECN))

About 100 Mt of municipal biowaste is generated every year in Europe.
Metal mechanical company since 1979.
Highly specialized personnel (200 people)
High production capacity (25,000 m²)
We transform the metal to shape your ideas and projects since 1979.
TRANSFORM THE ORGANIC and CELLULOSIC WASTE into Advanced fuels, Bioproducts and Bioenergy

BIOREFINERY FROM ORGANIC WASTE since 2007
LABORATORIES

Biotechnological process
Pretreatment processes
Fermentation processes
Organic waste integral valorization

SEMI-INDUSTRIAL PLANT

Laboratory pilot until 50 L
Capacity 25 t/d in fermentation process

BIOREFINERY FROM ORGANIC WASTE since 2007
## Ongoing Biorefinery Projects

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<tr>
<th>Year</th>
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<td>2017-2021</td>
<td>Ongoing Biorefinery Projects</td>
<td>Demonstration of an integrated innovative biorefinery for the transformation of Municipal Solid Waste (MSW) into new BioBased products. (GA No. 745785)</td>
<td>URBFIN</td>
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<td>2017-2020</td>
<td>Chemical building blocks from versatile MSW biorefinery.</td>
<td>(GA No. 745828)</td>
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<td>2017-2020</td>
<td>Valorization of urban wastes to new generation of bioethanol</td>
<td>(EXP-00098459 / SERA-20171009)</td>
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Este proyecto ha recibido financiación del programa ERA-NET CO-FUND BESTF3 con cofinanciación de CDTI y MINECO en España y DECC en Reino Unido así como del Programa Marco de Investigación e Innovación, H2020, de la Unión Europea.
Demonstration of an integrated innovative biorefinery for the transformation of Municipal Solid Waste (MSW) into new BioBased products (GA 745785)
Project Objective

10 t/d OFMSW

- Bioethanol
- Volatile fatty acids
- Biogas

BIO-POLYMERS

- Polyhydroxyalkanoates
- Combined PHA’s

ADDITIVES

- Bioethylene
- Biochemical products
✓ Feedstock requirements
✓ Final products requirements
✓ Biorefinery process integration and improvements
✓ Biorefinery engineering design and building up
Pilot plants DEMO activity.
PERCAL will exploit OFMSW as feedstock to develop intermediate chemical products at high yield and low impurity level with huge industrial interest.

- **Bioethanol** (current PERSEO Bioethanol® technology) as chemical building block.
- **Lactic acid (LA)** to produce:
  - Eco-friendly *ethyl lactate* solvents by reactive distillation from lactic acid & bioethanol.
  - *Hot-melt adhesives* in combination with maleic anhydride by reactive extrusion.
- **Succinic acid (SA)** as an intermediate building block to produce polyols for the polyurethane industry.
- **Biosurfactants** by chemical modification of proteins and lipids from the remaining fraction of MSW fermentations.
Overall concept

Representative selected MSW streams

Chemicals Intermediates

Succinic acid
Lactic acid
Ethanol

Fermentation by-products

Final products

Solvents for cleaning products, inks...

Hot melts Adhesives for cardboard

Polyols for polyurethane Industry

Final products

Biosurfactant

Biobased surfactants for cleaning's chemicals

Biotechnology routes
Green Chemistry routes
Separation and purification
Enzymatic Hydrolysis

Carbohydrates
L Lipids
Proteins
To maximise the yield of intermediates and minimise the presence of inhibitors.

To achieve an overall economic feasibility of a waste-to-chemicals value chain.

To address the heterogeneous and variable composition of organic MSW.

To evaluate the competitiveness of process technologies when scaled-up.

To perform an environmental and socio-economic assessment.
Chemical building blocks from versatile MSW biorefinery

- 12 partners covering the value chain of MSW treatment to bioproducts

Project coordinator: [IMECAL] [perseo]

Partners: [AIMPLAS] [ATB] [IRIS] [Covestro] [CENER] [tbw] [YPAREX] [Hayat] [exergy] [Bio-based Industries Consortium]

www.percal-project.eu

Percal Project

@PERCAL_project
The **main objective** of the WASTE2BIO project is to **validate and demonstrate a global process for the production of bioethanol as liquid biofuel and biogas from the remaining recoverable organic fraction from MSW** in order to **enhance the valorization of residues, reducing energy costs and impacts** from waste management and contribute to **an improved balance of GHG emissions from biofuels and to the achievement of the EU's objectives.**
Biorefinery from waste

Caterina Coll Lozano
Innovation manager
Caterina@imecal.com
http://www.imecal.com/perseo