

# PEference

From bio-based feedstocks via di-acids to multiple advanced bio-based materials with a preference for polyethylene furanoate



## Summary

PEference will establish a unique, industrial scale, cost-effective biorefinery flagship plant producing FDCA (furan dicarboxylic acid), a bio-based building block to produce high value products.

Bio-based FDCA can be used to make a wide range of chemicals and polymers such as polyesters, polyamides, coating resins and plasticizers and, crucially, can also be used to make PEF (polyethylene furanoate), a 100% bio-based polyester used to make bottles, films and fibres.

The PEference consortium aims to replace a significant share of fossil-based polyesters, such as polyethylene terephthalate (PET), and packaging materials like glass and metal with 100% bio-based furanics polyesters. PEF's excellent barrier properties and its calculated cost price indicate that it can compete with traditional, multi-million tonne, packaging products such as aluminium cans, multilayer packaging and small size multilayer PET bottles, on price and performance when produced at scale. PEF is sustainable and also completely recyclable.

Other promising materials to be validated in the project include PBF (Polybutylenefuranoate) and FDCA-based polyurethanes.

<http://peference.eu/>

**Type of Action:**  
Innovation Action – Flagship

**Value Chain:** VC1 –  
lignocellulose

**Start date:** 01 September  
2017

**End date:** 31 August 2022

**BBI JU contribution:** €  
24,999,610.00

## Objectives

- Engineer and build the flagship plant for the production of purified FDCA (50,000 tonnes/year)
- Demonstrate and validate at least three 100% bio-based materials in end user applications:
- Commercialize the 100 % bio-based end products demonstrated in the project.
- Demonstrate and optimize the new local bio-based value chain from raw material sourcing to PEF end products
- Evaluate the environmental and socio-economic performance of the developed products

## Expected impacts

PEference will have the following impacts:

- Maximising the use of regional agricultural resources and decreasing dependence on oil imports while increasing added value to the European economy
- Establishing a new bio-based value chain that will create jobs in rural areas while developing technological know-how and translating it into industrial products
- Best scenario to have an industrial scale MMF-FDCA plant (>200,000 tonnes/year FDCA) built in Europe
- Demonstrate new 100% bio-based materials (PEF,PBF and polyurethanes) based on the diacid FDCA
- Demonstrate cost efficiency and improved properties of PEF compared to PET and focus on applications where PEF brings most value

- Using PEF, substantially reduce non-renewable energy use and carbon emissions compared to petroleum-based plastics and other materials
- PEF is 100% recyclable into other PEF applications
- Reduce food waste and energy consumption of end products and increase the sustainability of coatings, elastomers and adhesives
- Augment the drive towards bio-based industrial products for global markets and establish FCDA as a versatile furanics building block while developing PEF for packaging applications

## Project coordination

- Synvina CV (The Netherlands)
- Spinverse Innovation Management Oy (Finland)
- Tereos Participations SAS (France)
- BASF SE (Germany)
- nova-Institut für politische und ökologische Innovation GmbH (Germany)
- Avantium Chemicals BV (The Netherlands)
- Croda Netherlands BV (The Netherlands)

**Organisation name:** Synvina CV (The Netherlands)

## Communications Coordinator

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