



# SUSTAINABLE PACKAGING, RESEARCH TRENDS AND INNOVATION

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**STANDARDIZATION IN PLASTICS AND CIRCULAR ECONOMY**

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# HaDEA

# HaDEA - European Health and Digital Executive Agency

- HaDEA manages European **programmes and initiatives** on behalf of the Commission.
- It works closely together with its partner DGs **CNECT, DEFIS, GROW, RTD** and **SANTE** which is in the lead – all of them focusing on legislative and strategic tasks in policymaking.
- HaDEA addresses the European Commission's ambition to help **rebuild a post-COVID-19 Europe** at its heart, which will be **greener, more digital, more resilient** and **better fit** for the current and forthcoming challenges.

# HaDEA - European Health and Digital Executive Agency

HaDEA will contribute to the previously mentioned ambition by implementing the following programmes (with indicative budgets):

- **EU4Health programme:** €5,1 billion
- **Horizon Europe: Pillar II, Cluster 1:** Health: €4,8 billion
- **Single Market Programme:** Food safety: health for humans, animals and plants along the food chain and better training for safer food: €1,3 billion
- **Digital Europe Programme:** €0,8 billion
- **Connecting Europe Facility:** Digital: €1,7 billion
- **Horizon Europe: Pillar II, cluster 4:** Digital, Industry and Space: €5,5 billion
- + Legacy: *financial commitments and projects from the predecessor programmes*

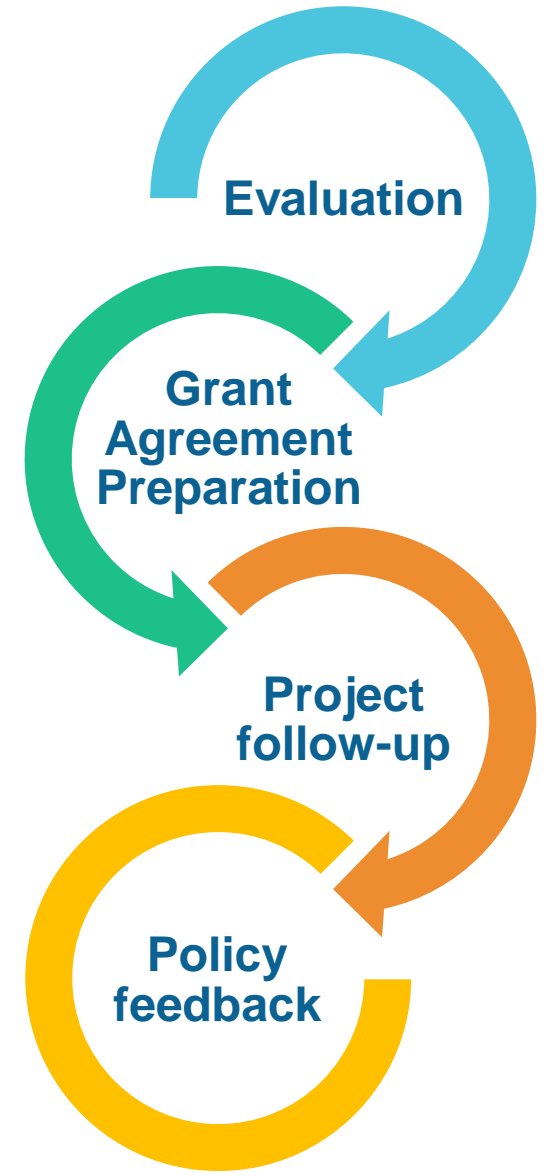
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# HaDEA's role

- Managing EU programmes
- Feeding into the policy-making process the project's outcome & success stories
- In charge of the whole project life:
  - **Evaluation** of Proposals
  - **Grant Agreement** Preparation
  - Scientific/Technical and Financial **monitoring** of projects
  - Supporting **exploitation and dissemination** of project results (policy feedback)



# Some projects on plastics and on packaging granted by HaDEA



# MMAtwo - Second generation Methyl MethAcrylate

- **Call:** H2020-NMBP-ST-IND-2018-2020
- **Topic:** CE-SPIRE-10-2018 - Efficient recycling processes for plastic containing materials (IA)
- **Instrument:** Innovation Action
- **Project number:** 820687
- **Start date:** 1 October 2018      **End date:** 30 September 2022
- **EU contribution:** € 6 664 702,76
- The MMAtwo project main objective is to construct a novel and fast growing **PMMA recycling** value chain through depolymerization and recovery of a monomer grade sold at 90 % of virgin MMA price. MMAtwo targets to reduce the energy needs by more than 70 % and the CO2 emissions by more than 60 %. To achieve its objective, MMAtwo integrates representative players along the value chain. During the project, PMMA will be collected from production scraps, but also from End-of-Life vehicles, Electronics goods and construction.

# iCAREPLAST - Integrated Catalytic Recycling of Plastic Residues Into Added-Value Chemicals

- **Call:** H2020-NMBP-ST-IND-2018-2020
- **Topic:** CE-SPIRE-10-2018 - Efficient recycling processes for plastic containing materials (IA)
- **Instrument:** Innovation Action
- **Project number:** 820770
- **Start date:** 15 October 2018      **End date:** 14 October 2022
- **EU contribution:** € 6 507 043,25
- iCAREPLAST addresses the cost and energy-efficient recycling of a large fraction of today's non-recyclable plastics and composites from urban waste. Heterogeneous plastic mixtures will be converted into valuable chemicals (alkylaromatic) via chemical routes comprising sequential catalytic and separation steps. This multistage process will also yield carbon char and a pure CO<sub>2</sub> stream as products, whilst it will present improved economic sustainability, operational flexibility and lower CO<sub>2</sub> footprint.

# ISOPREP - Ionic Solvent-based Recycling of Polypropylene Products

- **Call:** H2020-NMBP-ST-IND-2018-2020
- **Topic:** CE-SPIRE-10-2018 - Efficient recycling processes for plastic containing materials (IA)
- **Instrument:** Innovation Action
- **Project number:** 820787
- **Start date:** 1 October 2018      **End date:** 30 September 2022
- **EU contribution:** € 6 314 631,14
- A method (ISOPREP) is proposed for recycling polypropylene (PP) products into virgin quality PP and hence reusable for the production of the highest grade PP products. The method exploits a novel ionic polymer solvent designed for highly tuned solubility of PP, patented within the partnership, with the key advantages/innovations. Although applicable to a wide range of products, the concept will be developed and demonstrated at pilot plant stage for recycling polypropylene carpet.

# MultiCycle - Advanced and sustainable recycling processes and value chains for plastic-based multi-materials

- **Call:** H2020-NMBP-ST-IND-2018-2020
- **Topic:** CE-SPIRE-10-2018 - Efficient recycling processes for plastic containing materials (IA)
- **Instrument:** Innovation Action
- **Project number:** 820695
- **Start date:** 1 November 2018      **End date:** 30 April 2022
- **EU contribution:** € 7 681 576,90
- MultiCycle will deliver an industrial recycling pilot plant for thermoplastic-based which allows recovering pure plastics in mixed wastes but also fibres without downgrading. MultiCycle process will be demonstrated in 2 main large volume sectors (as providers of waste to recycle and end users of the recycled materials):
  - Multilayer packaging but also flexible films that cannot be recycled cost effectively to date and altogether account for around 50% of plastic packaging, i.e. ca. 10 millions tons/year in EU.
  - Fibre reinforced thermoplastic composites for the automotive sector from which plastics constitute around 16% of End-of-Life Vehicles weight, i.e. ca. 1 million tons/year in EU.

# POLYNSPIRE - Demonstration of Innovative Technologies towards a more Efficient and Sustainable Plastic Recycling

- **Call:** H2020-NMBP-ST-IND-2018-2020
- **Topic:** CE-SPIRE-10-2018 - Efficient recycling processes for plastic containing materials (IA)
- **Instrument:** Innovation Action
- **Project number:** 820665
- **Start date:** 1 September 2018      **End date:** 28 February 2023
- **EU contribution:** € 7 681 576,90
- The main objective of POLYNSPIRE is to demonstrate a set of innovative, cost-effective and sustainable solutions, aiming at improving the energy and resource efficiency of post-consumer and post-industrial plastic recycling processes, targeting 100% waste streams containing at least 80% of plastic materials. To this end, three innovation pillars are addressed: A) Chemical recycling assisted by microwaves and smart magnetic catalysts as a path to recover plastic monomers and valuable fillers (carbon or glass fibres), B) Advanced additivation and high energy irradiation to enhance recycled plastics quality and C) Valorisation of plastic waste as carbon source in steel industry.

# CARBAFIN - Carbohydrate-based fine chemicals: Development of a glycosylation platform cell factory and optimization of downstream processing for the sustainable production of glycosides

- **Call:** H2020-NMBP-2016-2017
- **Topic:** BIOTEC-06-2017 - Optimisation of biocatalysis and downstream processing for the sustainable production of high value-added platform chemicals
- **Instrument:** Innovation Action
- **Project number:** 761030
- **Start date:** 1 January 2018      **End date:** 30 June 2022
- **EU contribution:** € 5 362 908,75
- CARBAFIN will develop, based on an integrated biocatalytic production technology, a radically new value chain for the utilisation of surplus sucrose from sugar beet biomass in the EU. CARBAFIN will demonstrate bio-based co-production of a functional glucoside and fructose. The glucoside products of CARBAFIN (glucosylglycerol, cellodextrin) have large-scale uses in nutrition and feed, cosmetics and detergents. Fructose is exploited in the production of 5-hydroxymethylfurfural (HMF), a versatile chemical building block currently considered for making bio-based plastics.

# FlexFunction2Sustain - Open Innovation Ecosystem for Sustainable Nano-functionalized Flexible Plastic and Paper Surfaces and Membranes

- **Call:** H2020-NMBP-TO-IND-2018-2020
- **Topic:** DT-NMBP-03-2019 - Open Innovation Test Beds for nano-enabled surfaces and membranes (IA)
- **Instrument:** Innovation Action
- **Project number:** 862156
- **Start date:** 1 April 2020 **End date:** 31 March 2024
- **EU contribution:** € 14 231 400
- Today, a wide range of products, including packaging, consumer electronic devices and even car windows, use plastic and paper-based flexible materials and films based on nano-enabled functionalisation of the surfaces. The sector is facing a major challenge consisting of overcoming plastic waste pollution by following the European Strategy for Plastics in a Circular Economy and adopting digitalisation and products ready to be integrated into smart frameworks. The EU-funded FlexFunction2Sustain project is the first European initiative aiming to support the industry with a sustainable open innovation ecosystem that will enhance innovation for nano-functionalised flexible plastic and paper surfaces and films.  
The services will be offered to EU SMEs through an independent single entry point legal institution.

# Use of LCA



# Main reasons to use LCA

- Compare current/existing system with new one
- Identify the step of the life cycle with highest potential environmental impact
- Identify the component of a system (eg packaging system) with highest potential environmental impact
  
- Complemented by LCC and S-LCA

# Research trends and Innovation

# Trends and Innovation - challenges

- Replacement of traditional fossil fuel materials by novel ones from renewable resources
- Materials from bio-sources not always result in eco-friendly products
- End-users and consumers appreciate eco-friendly products (including packaging)
  
- Prices of plastics (from fossil sources) rapidly increase and alternatives must be found
- Overcome competitive advantage of a large growing packaging industry in Southeast Asia (India and China)
  
- Bio-plastic or paper based packaging do not provide the desired shelf-life of the products and must be improved to be competitive towards traditional materials
- Novel materials require upgrade and adapted processing machines
- Novel materials are available at lab scale or small quantities only (and at high price) and require industrial upscaling and cost-optimisation to be accepted in the market
  
- Clarification of the possible misuse of the concepts such as compostability and biodegradability
  
- Sustainable material sourcing and responsible consumption; the whole life cycle must be considered and evaluated
  - as little as possible; as much as needed

# Your contacts at HaDEA, Unit B3 Industry



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# Keep in touch



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# Thank you