



PPP Project Annual Report 2018	
the consortium:	
Possible feedback on the annual report:	

General information	
PPP number	TKI-AF-15233
Title	PEFPACK - Duurzame verpakkingsmaterialen gebaseerd op agrozijstroom (<i>Sustainable packaging materials based on agricultural side streams</i>)
Roadmap/Umbrella	Biobased Economy
Executive knowledge institution(s)	Wageningen Food & Biobased Research
Research project leader (name + e-mail address)	Maarten van der Zee (maarten.vanderzee@wur.nl)
Main applicant (on behalf of private parties)	Andrea Arias (andrea.arias@corbion.com) Stephan Roest (stephan.roest@corbion.com)
Government contact person	Jan van Esch (j.w.j.vanesch@minez.nl)
Start date	01-04-2016
End date	30-05-2019
Short content description/aim PPS	
<p>In the PEFPACK project, Corbion, Refresco, Plastipak and WFBR work together across the packaging value chain in the research and development of PEF, a polymer based on furan dicarboxylic acid (FDCA). Elements of the project include the production routes of FDCA-based polymers (with Corbion and WFBR), and its subsequent conversion in to packaging films (WFBR) and beverage bottles (WFBR, Plastipak and Refresco).</p> <p>Unique aspects of the project include the investigation of the addition of co-monomers to improve the properties of PEF (WFBR), as well as exploring the recyclability of the material (Plastipak, Refresco and WFBR).</p>	

Planning and progress	
Is the PPP going according to plan? ¹	Yes. According to the updated Workplan 2018 version 2 (dd 30-03-2018) the project will end in May 2019
Have there been changes in the consortium/project partners?	No
Is there a delay and/or deferred delivery date?	No: Project is on schedule according to the updated Workplan 2018 version 2 (dd 30-03-2018).
Are there any substantive bottlenecks? Provide a brief description	Currently no bottlenecks foreseen
Are there any deviations from the projected budget?	No: Budget is on schedule according to the updated Workplan 2018 version 2 (dd 30-03-2018). However, the allocation of approx. 75 k€ in cash contribution of the industrial users group still needs to be settled in 2019. Corbion, Refresco and Plastipak intend to divide this in cash contribution between themselves. Should these parties not come to an agreement on this, the total project budget may need to be adjusted

¹ If applicable, use the explanation from the financial project report

	accordingly.
Do you expect a patent application to arise from this PPP?	Possibly

<p>Current summary of the project for the website Kennisonline</p> <p>PEFPACK – Developing new food and beverage packaging based on PEF</p> <p>Corbion, Plastipak and Refresco work with Wageningen Food & Biobased Research (WFBR) in the PEFPACK project on the development of new food and beverage packaging based on PEF and PEF co-polymers.</p> <p>Project scope</p> <p>The PEFPACK project is committed to the research and development of PEF, a polymer based on FDCA (furan dicarboxylic acid) across the packaging value chain. Elements of the project include the production routes of FDCA-based polymers (with Corbion and WFBR), and its subsequent conversion in to packaging films (WFBR) and bottles (WFBR, Plastipak and Refresco).</p> <p>Unique aspects of the project include the investigation of the addition of co-monomers to improve the properties of PEF, as well as exploring the recyclability of the material (with Plastipak, Refresco and WFBR).</p> <p>Benefits of PEF</p> <p>PEF is a bio-based alternative polymer to PET which is commonly used in packaging applications. PEF can be made from the byproducts of agricultural streams and therefore contributes to the efficient use of renewable resources. As it is a bio-based material, PEF leads to a reduction in CO₂ emissions when replacing PET (which is based on fossil-based TPA (terephthalic acid)).</p> <p>Additionally, PEF potentially may have properties that will lead to better packaging functionality in terms of both manufacture and performance. Benefits may include lower energy consumption in production, improved barrier properties for increased shelf-life of packaged food, as well as lighter-weight packaging needed to deliver equivalent performance. As a direct replacement for PET, there would be no impact on conversion and logistical chains.</p>
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<p>Highlights:</p> <p>The following results have been achieved so far:</p> <ul style="list-style-type: none"> • Approx. 50 kg of purified, polymer grade FDCA was produced for the project through microbial oxidation of HMF. • Part of this FDCA was used to produce various R&D-, reactor-, and SSPC-grades of PEF which were subsequently characterized with regard to molar mass, intrinsic viscosity, DEG contents, thermal properties, rheological properties, crystallisation behaviour, etc. • Several sheet-extrusion trials with SSPC grade PEF have been performed resulting in a substantial number of PEF film samples, suitable for 2D biaxial stretching trials to modify the mechanical and barrier properties of the material. • A series of 2D biaxial stretching trials have been performed on PEF film samples providing essential information on stretching behaviour required for optimization processing conditions for packaging film production and bottle blowing. • A range of reactive extrusion trials (ranging from 20 gram-scale to several kilogram-scale) have been performed to modify the FDCA-based polymer • Several PEF polymerization trials have been performed on 30 gram-scale introducing small amounts of comonomers with the aim of altering/improving the material properties. Several materials have been synthesized and characterized with regard to incorporation ratio, molar mass, DEG content and thermal properties. A selection of most promising polymerizations is being scaled up to the kilogram level.
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Number of delivered products in 2018			
Academic articles	Reports	Articles in journals	Introductions/workshops

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Appendix: Names of the products or a link to the products on a public website

No public reports published so far.

Link to Kennisonline/TKI AF:

EN:

<https://www.wur.nl/en/Research-Results/kennisonline/PEFPACK-Developing-new-food-and-beverage-packaging-based-on-PEF.htm>

NL:

<https://www.wur.nl/nl/Onderzoek-Resultaten/Onderzoeksprojecten-LNV/Expertisegebieden/kennisonline/Duurzame-verpakkingsmaterialen.htm>