



<b>General information</b>	
PPP-number	<b>TKI-AF 18004</b>
Title	<b>Biobased plasticisers from agricultural (side) streams</b>
Theme	<b>Circular</b>
Implementing institute	<b>Wageningen FBR</b>
Project leader research (name + e-mail address)	<b>Dr. Erik Hagberg, <a href="mailto:Erik.Hagberg@adm.com">Erik.Hagberg@adm.com</a></b>
Coordinator (on behalf of private partners)	<b>Dr. D.S van Es</b>
Project-website address	<p><a href="https://www.wur.nl/nl/Onderzoek-Resultaten/Onderzoeksprojecten-LNV/Expertisegebieden/kennisonline/Biobased-plasticizers-from-agricultural-side-streams.htm">https://www.wur.nl/nl/Onderzoek-Resultaten/Onderzoeksprojecten-LNV/Expertisegebieden/kennisonline/Biobased-plasticizers-from-agricultural-side-streams.htm</a></p> <p><a href="https://topsectoragrifood.nl/project/af-18004-biobased-plasticizers-from-agricultural-side-streams/">https://topsectoragrifood.nl/project/af-18004-biobased-plasticizers-from-agricultural-side-streams/</a></p>
Start date	<b>01/06/2019</b>
Final date	<b>31/12/2021</b>

<b>Approval by the coordinator of the consortium</b>	
The annual report must be discussed with the coordinator of the consortium. The "TKI's" appreciate additional comments concerning the annual report.	
Assessment of the report by the coordinator on behalf of the consortium:	<input checked="" type="checkbox"/> Approved <input type="checkbox"/> Not approved
Additional comments concerning the annual report:	Due to some delays with respect to the signing of the consortium agreement the project officially started in June 2019, causing a delay in the initial planning. A further delay was caused by the summer holiday period and time consuming materials exchange and procurement. Most of the delays were eventually solved by drastically increasing the amount of resources committed.

<b>Summary of the project</b>	
Problem definition	<p>Furan dicarboxylic acid (FDCA) can be derived from various agricultural resources, including both first and second generation sugars. FDCA is considered as one of the most promising biobased building blocks. It serves e.g. as building block to produce PEF: Polyethylene Furanoate; a biobased polymer with huge potential to supplement or substitute fossil based PET in many applications. As FDCA is on the brink of commercialisation, defining and establishing other major market outlets for FDCA is highly relevant. Due to the significant volumes FDCA based plasticisers are an attractive market for biobased products. Furthermore, FDCA based plasticisers have the potential to replace petrochemical based phthalate plasticisers which are under increasing regulatory pressure due to real or perceived negative effects on human health and the environment. Previous feasibility studies have shown that FDCA based plasticisers are highly promising alternatives for phthalates in PVC. Nevertheless, some properties of FDCA based plasticisers are not yet fully understood,</p>

	which needs to be addressed in order for these materials to reach commercialisation.
Project goals	The overall aim of this project and the consortium partners will be to generate generic knowledge to understand and improve the overall performance of FDCA based plasticisers, and in parallel generate knowledge on FDCA based esters in general.

<b>Results</b>	
Planned results 2019	<ul style="list-style-type: none"> <li>• Exchange synthetic and analytical protocols</li> <li>• Industrial partners to send their specific feedstocks for plasticiser synthesis to WFBR and each other</li> <li>• Acquire Materials and Chemicals for harmonised PVC processing experiments</li> <li>• Procure, install and test specific testing equipment</li> <li>• Synthesis, characterisation and purification of a range of FDCA based esters and reference substances</li> <li>• Set-up of specific analytical protocols</li> <li>• Set-up of specific testing equipment and protocols</li> <li>• Process FDCA plasticisers and industrial benchmarks in PVC compounds</li> <li>• Perform standard PVC related testing of PVC compounds</li> <li>• Study performance of FDCA plasticisers in PVC formulation relative to industrial benchmarks</li> <li>• Produce FDCA polyesters on lab-scale as high MW analogue of FDCA plasticisers</li> <li>• Identify and elucidate specific FDCA related properties</li> </ul>
Achieved results 2019	<p>Most of the planned results of 2019 were achieved. The last planned result, identification of specific FDCA related properties, is an ongoing process.</p> <p>FDCA plasticisers were synthesised and purified on sufficient scale (100's of grams), in accordance with industrial requirements</p> <p>Synthesised plasticisers were exchanged between consortium partners for mini round Robin analysis and testing. The same was done for processed PVC material.</p> <p>PVC was processed on WFBR equipment, and new staff was trained in PVC processing techniques (dry-blending/compounding, roll-milling, compression moulding). Specific property testing was initiated, equipment procured, installed and tested.</p>
Planned results 2020	<ul style="list-style-type: none"> <li>• Finish FDCA plasticiser synthesis</li> <li>• Finish FDCA polyester synthesis</li> <li>• Process more FDCA plasticisers in PVC, in several types of PVC compounds</li> <li>• Continue performance testing of FDCA based materials under specific conditions</li> <li>• Continue Identification and Elucidation of specific FDCA related properties</li> <li>• Establish preliminary <i>in vitro</i> toxicity of newly synthesised FDCA plasticisers</li> </ul>

<b>Deliverables/products in 2019</b> (provide the titles and /or a brief description of the products/deliverables or a link to a website.
<u>Scientific articles:</u> None yet
<u>External reports:</u> -

<u>Articles in professional journals/magazines:</u> -
<u>(Poster) presentations at workshops, seminars, or symposia.</u> -
<u>TV/ radio / social media / newspaper:</u> -
<u>Remaining deliverables (techniques, devices, methods, etc.):</u> -

<https://www.wur.nl/nl/Onderzoek-Resultaten/Onderzoeksprojecten-LNV/Expertisegebieden/kennisonline/Biobased-plasticizers-from-agricultural-side-streams.htm>

<https://topsectoragrifood.nl/project/af-18004-biobased-plasticizers-from-agricultural-side-streams/>