PPP Project Annual Report 2018
The PPP-projects that have been established under the direction of the top sectors must submit an annual report on their technical and financial progress. This format is to be used for reporting the technical progress. A separate format ('PPP final report') is available for PPP-projects that have been completed in 2018.
The annual reports will be published in full on the websites of the TKIs/top sector, excluding the blocks 'Approval coordinator/consortium' and 'Planning and progress' . Please ensure that no confidential matters are left in the remaining blocks.
The PPP Project Annual Reports must be submitted by 15 February 2019 to Hans van der Kolk

General information	
PPP number	TKI-BBE-1703/AF16072 TKI toeslag project
Title	Environmentally benign process starch derivatisation
Theme	Circulair
Executive knowledge institution(s)	WFBR
Research project leader (name + e-mail address)	Prof. Dr. P. Buwalda, Avebe, piet.buwalda@avebe.com
Coordinator (on behalf of private parties)	Dr. D. S. van Es, daan.vanes@wur.nl
Government contact person	Jan van Esch
Total project size (k€)	680,400 €
Address project website	- wel op site TS AF zie hieronder
Start date	01/01/2017
End date	31/12/2019

Approval coordinator/consortium The annual report should be discussed with the coordinator/the consortium. The TKIs appreciate being informed of possible feedback on the annual report.	
The coordinator has assessed the annual report on behalf of the consortium:	approved
Possible feedback on the annual report:	-

Short content description/aim PPS
What is going on and how is this project involved?
What will be delivered by the project and what is the effect of this?

The starch producing sector in the EU is a growing agricultural sector and is increasingly depending on adding value to its products to retain a competitive position in the world market. Derivatisation of starch enables technical applications, for instance in adhesives, construction and textile. This project aims to develop a more environmentally friendly reagent for the derivatisation of starch that will half the amounts of chemicals required, and develop technology to synthesise this reagent from biobased feedstock. If successful, the application potential is substantial: besides the above-mentioned technical applications, the biobased reagents may also be used for other products like coatings, sequestering agents for detergents or personal care products or in the derivatisation of other polysaccharides besides starch, like cellulose or inulin.

Planning and progress (if there are changes to the project plan, please explain)	
Is the PPP going according to plan?	Yes 1) Additional stability tests on the malonic acid derivatives show that stability under reaction conditions is more than sufficient 2) Reactions with starch show that previous results are reproducible, and sample material was delivered to Avebe for further testing 3) Reactions performed on starch using more activated malonates show that a significant increase in degree of substitution (DS) is possible 4) A test program was successfully initiated to systematically investigate various physico chemical aspects of the derivatisation reaction, including solubility and kinetics of substrates and catalysts. 5) Work on catalytic conversion of glycerol to malonic acid derivatives was started. Initial results are promising. Further developments will be performed in close collaboration with Nouryon. Conceptual process design will be used to get insights in the various possible processes, and these results will be used to a) choose for the most optimal route, and b) identify targets for further research.
Have there been changes in the consortium/project partners?	Yes: Akzo-Nobel Chemicals was split-off from Akzo-Nobel and became the company Nouryon. However, this has no consequences for the project.
Is there a delay and/or deferred delivery date?	Yes, No Some project delays were encountered in 2018 due to organisational factors and lack of resource capacity. Delays are expected to be solved in 2019. For now no deferred delivery date foreseen.
Are there any substantive bottlenecks?	None
Are there any deviations from the projected budget?	No; in-kind contribution of partners is expected to substantially grow in 2019, as their activities are becoming more clear.

Results in 2018/ so far

Give a short description of the high-lights and (most important) project deliverable in 2018 / so far and their target group

- Activities in year 2 showed that the reagent used for this project has superior hydrolytic stability compared to the currently used reagent, enabling a substantially increased window of operations, and potentially reduced waste stream due to more efficient use of the reagent
- Starch derivatisation experiments thus far show that the required reaction efficiency can be achieved. Ongoing optimisation studies show that further improvements are possible.
- After derivatisation, colourless products were obtained.
- First results on environmentally benign catalytic conversion of biomass feedstocks to reagents for starch derivatisation are promising, both with regard to conversion and selectivity towards the desired product. Industrial viability will be further substantiated using conceptual process design.

Number of delivered products in 2018 / so far *(in an appendix, please provide the titles and/or description of the products or a link to the products on public websites)*			
Academic articles	Reports	Articles in journals	Introductions/workshops

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

https://topsectoragrifood.nl/project/environmentally-benign-process-for-starch-derivatisation/