General information	
PPP-number	AF15210
Title	Soluble Bio-based Support Structures
Theme	Circular (Biobased Economy)
Implementing institute	Wageningen Food & Biobased Research
Project leader research (name + e-mail address)	Karin Molenveld, karin.molenveld@wur.nl
Coordinator (on behalf of private partners)	Bart de Koning (Canon)
Project-website address	https://www.wur.nl/nl/Onderzoek-Resultaten/Onderzoeksprojecten-LNV/Expertisegebieden/kennisonline/Soluble-Bio-based-Support-Structures-1.htm
Start date	01-07-2017
Final date	15-12-2019

Approval by the coordinator of the consortium The final report must be discussed with the coordinator of the consortium. The "TKI's" appreciate additional comments concerning the final report.	
Assessment of the report by the coordinator on behalf of the consortium:	X Approved ☐ Not approved
Additional comments concerning the final report:	

Consortium	
Mention any changes in the composition of the project partners:	No changes in the composition of the project partners, but the name of 'Océ Technologies' has changed in 'Canon Production Printing' by January 1st 2020.

Summary of the project	
Problem definition	Canon investigates options for applying own technology for 3D printing applications. Support structures that do not leave artefacts and that are environmentally benign offer advantages.
Project goals	The objective of this project is to demonstrate that it is feasible to substitute the current 3D printing support materials, with environmentally friendly bio-based alternatives. Focus is on the use of commercially available water soluble sugar derivatives.

Results	
Planned results in the original project plan	The planned result is the development of bio-based support products for 3D printing using ink jet technology, and to generate a proof of concept that bio-based materials can serve as support structures in 3D printing. Focus was to use commercially available sugar polyols

Achieved results	Within the project it was demonstrated that derivatives of sugar polyols are suitable as support products using ink-jet technology as they are in the correct viscosity range at printing temperatures, are thermally stable, solidify upon cooling and are water soluble and soluble in solvents used for cleaning of printer heads. These derivatives are near commercialisation.
Explanation of changes relative to the project plan	The commercially available sugar polyol are either too viscous or do not solidify upon cooling or are not compatible with current cleaning methods.

What was the added value created by the project for:	
Participating "Knowledge Institutes" (scientific, new technologies, collaboration)	The use of sugar derivatives in this new, technical application (3 D printing using ink jet technology) was demonstrated. Insight is generated on various properties of sugar derivatives that have not been studied before and could be used in other applications.
Participating private partners (practical application of the results, within which period of time?)	Potential new applications for sugar derivatives including new markets.
Society (social, environment, economy)	Using sugar derivatives current support structures can be replaced reducing the amount of chemical waste and further reducing the environmental footprint of 3D printing processes.
Possibly other stakeholders (spin-offs)	The technology can be relevant for companies that invest in the development of 3D printing applications.

Follow-up	
Did the PPP result in one or more patents (first filings)?	No
Are there any follow-up projects planned? If yes, explain. (Contract research resulting from this project, additional funding, or new PPP projects)	At this moment no follow-up projects are planned.

Deliverables/products during the entire course of the PPP (provide the titles and/or a brief description of the products/deliverables or a link to a website.
Scientific articles:
External reports:
Articles in professional journals/magazines:
(Poster) presentations at workshops, seminars or symposia. Rene van der Meer (Océ R&D): How to print a better world @ smart materials 2019 and & rapid pro. Presentation of 3D printing for dental structures including the reference to the TKI project on water soluble support materials.
TV/ radio / social media / newspaper:
Remaining deliverables (techniques, devices, methods, etc.):

https://www.wur.nl/nl/Onderzoek-Resultaten/Onderzoeksprojecten-LNV/Expertisegebieden/kennisonline/Soluble-Bio-based-Support-Structures-1.htm

https://topsectoragrifood.nl/project/soluble-bio-based-support-structures-for-digital-printing-applications/