Algemene gegevens	
TKI-Nummer	AF-EU-13003
Titel	SPLASH: Sustainable Polymers from Algae Sugars and Hydrocarbons
Topsector (A&F of T&U)	A&F
Projectleider (onderzoek)	Dr. Lolke Sijtsma
Werkelijke startdatum	1 September 2012
Werkelijke einddatum	28 Februari 2017
Korte omschrijving inhoud	Wageningen Research is responsible for projectmanagement, sequencing of the algae *Botryococcus braunii* and, in close cooperation with projectparters, strain improvement, optimization of algal cultivation and product formation, separation and conversion technologies and development of a pilot facility.

Uitvoerende partijen	
Betrokken kennisinstellingen	Wageningen Food & Biobased Research, Wageningen Plant Research
Overige partijen	Companies: PAQUES BV, Netherlands, AVANTIUM CHEMICALS BVNetherlands, PNO CONSULTANTS BV Netherlands, NIELS-HENRIK NORSKER, Denmark , VALUE FOR TECHNOLOGY Belgium, ORGANIC WASTE SYSTEMS NV Belgium, LIFEGLIMMER GMBH Germany, NOVA-INSTITUT FUR POLITISCHE UND OKOLOGISCHE INNOVATION GMBH Germany, LANKHORST EURONETE PORTUGAL Portugal, Rhodia Operations, France, Cellulac, Ireland, F&M, Italy Knowledge institutes WAGENINGEN UNIVERSITEIT, Netherlands, UNIVERSITAET BIELEFELD, Germany, FRAUNHOFER-GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V ,Germany, WESTFAELISCHE WILHELMS-UNIVERSITAET MUENSTER, Germany, THE UNIVERSITY OF CAMBRIDGE, United Kingdom, UNIVERSIDAD DE HUELVA, Spain, EGE UNIVERSITESI EGE Turkey

Highlights
The aim of SPLASH is to deliver knowledge, tools and technologies needed for the establishment of a new industry sector: Industrial Biotechnology with algae for the manufacture of polyesters and polyolefins. The project encompasses: 1.Development of Botryococcus as an industrial production platform

2.Systems biology analysis
3.Development of procedures for production, in situ extraction and isolation of sugar polymers and hydrocarbons
4.Product development

In 2016 we studied the production of sugar polymers and hydrocarbons by *B. braunii* in well controlled indoor production systems (by using outdoot conditions) and established membrane based technologies for separation of biomass and sugar polymer (milking concept, while keeping the cells alive) at laboratory and at DEMO scale. Extraction technologies for hydrocarbons were developed and tested. Tools to convert sugars into chemical building blocks for plastics were developed and the conversion efficiencies were determined. Genome sequencing is ongoing. Most of the genome of 1 stains was elucidated.
The work was published and presented in several (scientific) meetings

Aantal opgeleverde producten			
Wetenschappelijke artikelen	Rapporten	Artikelen in vakbladen	Inleidingen/ workshops/ invited lectures
7	-	-	6

Bijlage: Titels van de producten of een link naar de producten op een openbare website

2015

Bicas, J.L., Kleinegris, D.M.M., Barbosa, M.J. (2015)
Use of methylene blue uptake for assessing cell viability of microalgae. Algal Research 8 (2015) 174–180 (Publication)
http://www.sciencedirect.com/science/article/pii/S2211926415000302

Broek, L.A.M. van den, J.M. van , Klis, F. van der , Stoutjesdijk, J.H. , Boeriu, C. , Blaauw, R. (2015). Exopolysaccharides from Botryococcus braunii and the production of bioplastics. In: Proceedings 4th EPNOE International Polysaccharide Conference: Polysaccharides and polysaccharide-based advanced materials: from science to industry. p. 136 - 136.

Broek, L.A.M. van den , Klis, F. van der , Stoutjesdijk, J.H. , Boeriu, C.G. , Blaauw, R. (2015). Exopolysaccharides from Botryococcus braunii and the production of bioplastics In: Exopolysaccharides from Botryococcus braunii and the production of bioplastics. - Warsaw, Poland, 19-22 October 2015.

Kleinegris, D.M.M (2015) AlgaeParc's EU projects, SPLASH, MIRACLES, FUEL4Me and InteSusal. 8th October 2015, Wageningen, The Netherlands (presentation in the framework of Greentech week)

Sijtsma, L, A.G. Smith, D.M. Kleinegris, E. de Jong, M. Fenton, P. Willems, D. Vogt, M.J. Barbosa (2015). Botryococcus braunii as production platform for sugars and hydrocarbons to be used as building blocks for polymers: Progress of the EU FP7 project SPLASH. 2nd EABA and EC Algae contractors conference and the 9th international algae congress. Lisbon, 1-3 December 2015

Sijtsma, L., Barbosa, M.J. (2015) SPLASH: Sustainable PoLymers from Algae Sugars and Hydrocarbons Conference: Making more of Bio-economy results, 6- 7 October 2015, Brussels, Belgium

Sijtsma, L. (2015) Microbes –The New Bioplastic Factories http://commnet.eu/05_News/Microbes-The-New-Bioplastic-Factories.kl

Vigani, M. , Parisi, C. , Rodriguez-Cerezo, E. , Barbosa, M.J. **, Sijtsma, L. ,** Ploeg, M. , Enzing, C**.** (2015) Food and feed products from micro-algae: Market opportunities and challenges for the EU. Trends in Food Science and Technology 42 (2015)1. - ISSN 0924-2244 - p. 81 - 92. http://www.sciencedirect.com/science/article/pii/S0924224414002787

2016

Cubero, R.G., Dorinde Kleinegris, Maria Barbosa (2016). A better understanding of culture parameters to increase exopolysaccharide production by Botryococcus braunii CCALA 778 2016 European Roadmap for an Algae-Based Industry, 6-8 April 2016, Olhão, Portugal.

Cubero,R.G., Dorinde M.M Kleinegris, Maria Barbosa. (2016) Indoors culture of B.braunii CCALA778 simulating Mediterranean climate conditions. Algal Biomass, Biofuels & Bioproducts. San Diego (CA). USA.

Cubero, R.G., Dorinde M.M. Kleinegris, Maria Barbosa (2016) Indoors culture of B.braunii CCALA778 simulating Mediterranean climate conditions ALGAEUROPE, 13-15 December, Madrid, Spain, Book of abstracts pp177.

Kleinegris, D.M.M (2016). Milking of microalgae. Summerschool, Microalgae Biorefinery, 18-20 July 2016, Wageningen, The Netherlands.

Sijtsma, L., A.G. Smith, D.M. Kleinegris, E. de Jong, M. Fenton, P. Willems, D. Vogt, M.J. Barbosa. (2016) Sustainable PoLymers from Algae Sugars and Hydrocarbons (SPLASH). Poster presentation, Workshop Algae & Seaweed: February 18th 2016, Wageningen, The Netherlands

Sijtsma, L., A.G. Smith, D.M. Kleinegris, E. de Jong, M. Fenton, P. Willems, D. Vogt, M.J. Barbosa. (2016). SPLASH: Sustainable polymers from algae sugars and hydrocarbons. Presentation: European roadmap for an algae-based industry,6-8 April, Olhão, Portugal. http://eualgaeroadmapconference.eu/fileadmin/intesusal_docs/Documents/Industry_Seminars/Presentations_2016/Welcome/08.Lolke_2016-04-05_Olhao_SPLASH_LS.pdf

Sijtsma, L., A.G. Smith, D.M. Kleinegris, E. de Jong, M. Fenton, P. Willems, D. Vogt, M.J. Barbosa. (2016). SPLASH: Sustainable polymers from algae sugars and hydrocarbons. Abstract: European roadmap for an algae-based industry,6-8 April, Olhão, Portugal.

Sijtsma, L., A.G. Smith, D.M. Kleinegris, E. de Jong, R,J. van Putten, J. Carrigan, P. Willems, D. Vogt, M.J. Barbosa (2016). Abstract: Sustainable polymers from algae sugars and hydrocarbond (SPLASH): Lessons learned. ALGAEUROPE, 13-15 December, Madrid, Spain, Book of abstracts, pp89.

Sijtsma, L., A.G. Smith, D.M. Kleinegris, E. de Jong, R,J. van Putten, J. Carrigan, P. Willems, D. Vogt, M.J. Barbosa (2016). Presentation: Sustainable polymers from algae

sugars and hydrocarbond (SPLASH): Lessons learned. Presentation, ALGAEUROPE, 13-15 December, Madrid, Spain, http://algaecongress.com/2016-conference-program/

Van der Klis, F., van den Broek, L., Blaauw, R., Knoop, R., Bitter, H. (2016). Structure-property relations of biobased polyesters from 1,4-butanediol-analogues and biobased diacids. Oral presentation. CHAINS 2016, the Dutch chemistry conference on 6-8, December 2016. Veldhoven, The Netherlands.

Van den Broek, L.A.M. Stoutjesdijk J.H., Gelo-Pujic M., Norsker N.H., **Togtema A.**(2016). Properties of extracellular polysaccharides from Botryococcus braunii. Abstract: European roadmap for an algae-based industry,6-8 April, Olhão, Portugal.

Van den Broek, L.A.M. (2016). Analytical characterization techniques. Summerschool, Microalgae Biorefinery, 18-20 July 2016, Wageningen, The Netherlands.

2017

Carreres BM, de Jaeger L, **Springer J**, Barbosa MJ, Breuer G, van den End EJ, **Kleinegris DMM**, Schäffers I, Wolbert EJ, Zhang H, Lamers PP, Draaisma RB, Martins Dos Santos VA. (2017). Genome Announc. 2017 Jan 19;5(3). https://www.ncbi.nlm.nih.gov/pubmed/28104651

Link naar Kennisonline:

http://www.wur.nl/nl/project/SPLASH-duurzame-polymeren-uit-algen.htm