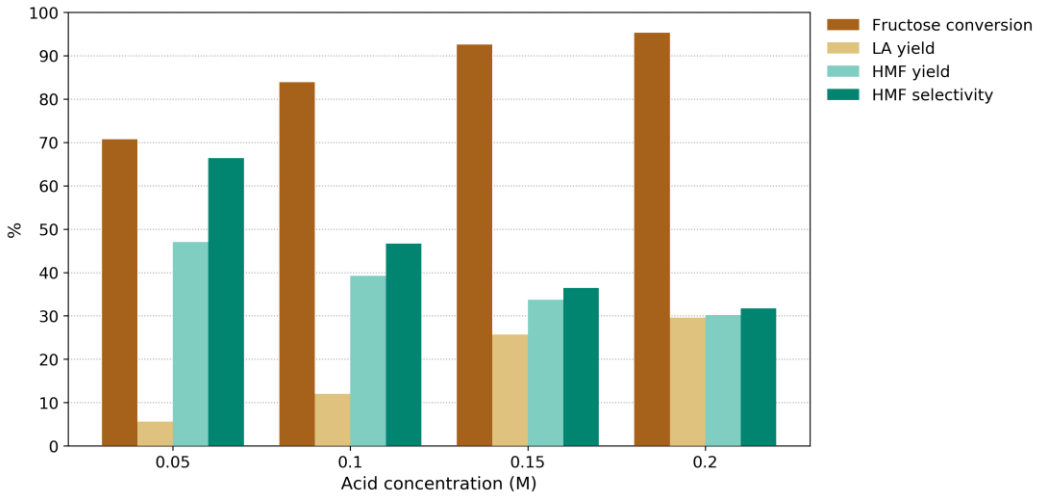
PPS-jaarrapportage 2019
De PPS-en die van start zijn gegaan onder aansturing van de topsectoren dienen jaarlijks te rapporteren over de inhoudelijke en financiële voortgang. Voor de inhoudelijke voortgang dient dit format gebruikt te worden. Voor PPS-en die in 2019 zijn afgerond is een apart format "PPS-eindrapportage" beschikbaar.
De jaarrapportages worden integraal gepubliceerd op de website het TKI's. Zorg er svp voor dat er geen vertrouwelijke zaken in staan.

De PPS-jaarrapportages dienen voor 1 maart 2020 te worden aangeleverd bij finance@tki-bbe.nl.

Algemene gegevens	
PPS-nummer	BBE 1804
Titel	Geïntensificeerde continue productie van Biobased chemicals
Roadmap	Chemische conversie
Uitvoerende kennisinstelling(en)	RUG
Projectleider onderzoek (naam + emailadres)	Dr. J. Yue yue.jun@rug.nl
Penvoerder (namens private partijen)	Prof.dr. ir. H.J. Heeres h.j.heeres@rug.nl
Contactpersoon overheid (indien relevant)	
Adres projectwebsite	
Startdatum	1-10-2018
Einddatum	Was 31-12-2019 is nu 31-3-2021

Goedkeuring penvoerder / consortium De jaarrapportage dient te worden besproken met de penvoerder/het consortium. TKI BBE neemt graag kennis van evt. opmerkingen over de jaarrapportage.	
De penvoerder heeft namens het consortium de jaarrapportage	X goedgekeurd
Evt. opmerkingen over de jaarrapportage:	

Inhoudelijke samenvatting van het project	
Probleemomschrijving	The chemical industry is undergoing a switch to green feedstocks and products. Lignocellulosic biomass represents an important renewable feedstock in this aspect. It can be valorized, via biobased platform chemicals, towards the manufacture of biobased fuels, chemicals and materials. 5-Hydroxylmethylfurfural (HMF) and levulinic acid (LA) are typical examples of such platform chemicals. In this project, continuous production of HMF and LA in intensified reactors will be investigated, in order to increase the technical and economic feasibility of the process.
Doelen van het project	The university of Groningen, in collaboration with Syncom, aims to develop efficient HMF and LA syntheses in continuous centrifugal contactor and separator (CCCS) devices on a small lab scale (TRL level 4). HMF and LA will be produced in CCCS in biphasic solvent systems (typically water-MIBK or MTHF) from typically fructose, glucose (as well as other polysaccharides) in the presence of homogeneous acid catalysts. The processing conditions in CCCS will be studied towards obtaining the optimized HMF and LA yields.

Resultaten	
Beoogde resultaten 2019	Setting up the CCCS device for high pressure and temperature experiments (up to 10 bar and 200 °C) relevant to HMF and LA syntheses. Carrying out preliminary experiments on HMF synthesis in biphasic systems from fructose.
Behaalde resultaten 2019	The CCCS device was modified (motor and pumps needed to be fixed and some parts were replaced) to be able to function properly at typical operating conditions (10 bar pressure, 140 °C and 1200 rpm of rotary speed). Various experiments using a biphasic water/MTHF system to obtain HMF from fructose were carried out. Two datasets were obtained, in which the volumetric ratio (organic flow/aqueous flow) and catalyst (H_2SO_4) concentration was varied to observe their influence on the fructose conversion, HMF yield, HMF selectivity and extraction efficiency to the organic phase. Good results were obtained for this biphasic solvent system. For instance, 70% of fructose conversion, HMF yields of around 50%, HMF selectivities of around 70% and extraction efficiencies of around 60% were observed (cf. the figure below).  These promising results show the CCCS potential for the valorization of biobased sugars into HMF. Recycling of the organic solvent has also been studied, with no impact in the results. Ongoing experiments involve the addition of salt to improve separation (and, therefore, HMF selectivity) and test of a real biobased stream in the system (crude sugar beet juice) provided by Suiker Unie-Royal Cosun.
Beoogde resultaten 2020	Optimized chemistry and CCCS operating conditions for: -HMF synthesis from fructose, glucose -LA synthesis from glucose A brief techno-economic assessment of the above processes.

Opgeleverde producten in 2019 (geef de titels en/of omschrijvingen van de producten / deliverables of een link naar de producten op de projectwebsite of andere openbare websites)
<u>Wetenschappelijke artikelen:</u>

Not yet. Manuscript currently in preparation.
Externe rapporten: Not yet.
Artikelen in vakbladen: Not yet.
Inleidingen/posters tijdens workshops, congressen en symposia: Not yet.
TV/ Radio / Social Media / Krant: Not yet.
Overig (Technieken, apparaten, methodes etc.): Not yet.