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 to the TKI's before March 1st 2019. For Wageningen Research this will be coordinated via a central point.

General information	
PPP number	AF-17048
Title	*Positieve gezondheidseffecten van GABA in aardappel en tomaat*
Theme	Voeding en Gezondheid
Executive knowledge institution(s)	Wageningen UR
Research project leader (name + e-mail address)	Maarten Jongsma, maarten.jongsma@wur.nl
Coordinator (on behalf of private parties)	Sjefke Allefs, Agrico BV, s.allefs@agrico.nl
Government contact person	?
Total project size (k€)	1000
Address projectwebsite	n.a.
Start date	1/2/2018
End date	1/2/2022

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 ☐ rejected S. allefs
Possible feedback on the annual report:	

Planning and progress (if there are changes to the project plan, please explain)	
Is the PPP going according to plan?	Yes
Have there been changes in the consortium/project partners?	No
Is there a delay and/or deferred delivery date?	No
Are there any substantive bottlenecks? Provide a brief description	The set up of measurements of GABA in blood samples took more time than expected and this delayed the submission of the METC protocol for pharmacokinetic GABA experiments by a few months.
Are there any deviations from the projected budget?	No

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?

Background: Gamma-amino butyric acid (GABA) is a product of the amino acid glutamate and a neurotransmitter involved in a multitude of biological processes in the human body. Oral intake according to the literature appears to lead to lowered bloodpressure and improved glucose metabolism. This is relevant for people with symptoms of "metabolic syndrome" but also for people that are (still) healthy. Tomato and potato are in the western diet by far the most important sources of oral GABA but the contents differ by more than a factor 20 between different varieties. The effects of existing food sources with high GABA has not yet been investigated in a human intervention study but are promising based on animal models.
Aim: The aim is to examine whether the high GABA content of some potato and tomato cultivars and potato extracts will have positive effects on human glucose metabolism and bloodpressure with high risk groups for prediabetes and/or mild hypertension that are not yet using drug prescriptions.
Innovation: In this research project intervention studies are planned that can demonstrate the expected positive impact on health of natural GABA in potato and tomato. Specific tomato and potato varieties with high content and proven health effects may pass the EFSA evaluation and obtain a health claim.
Expected impact: For the food sector this project sets an example of what is potentially possible and needed to establish health claims for food products derived from vegetables and staple crops. Currently there is a lot of scepticism whether such claims can be obtained and deliver a profitable market share despite the fact that diet and health are known to be intimately connected. Scientifically the topic is also in a hotspot because it concerns a compound that is known to have a central role in regulating many physiological and neurological processes, so that the interaction between oral and endogenous GABA deserves profound attention.

Results in 2018/ so far
Give a short description of the high-lights and project deliverable in 2018 / so far

GABA contents in 103 tomato and 71 potato varieties were determined. Contents in tomato ranged from 63 to 1372 mg/kg and in potato from 72 to 685 mg/kg. Selected high and low GABA fruits and tubers are now cultivated for larger quantities. Glutamate contents were also determined. Glutamate is the precursor of GABA and a recent publication in Nature Microbiology indicates that the gut microbiome is responsible for the observed variable basal levels of GABA in blood serum. Interestingly in potato and tomato glutamate levels are much higher than the GABA levels and potentially could be equally important for raising serum levels of GABA. In potato glutamate levels ranged 894 to 2043 mg/kg and in tomato 2051 to 8212 mg/kg. It also illustrates that there is a lot of room in breeding for converting more glutamate to GABA already in the plant.

The effects of various cooking and processing procedures of tomato and potato normally used in food preparation were tested for their effects on glutamate and GABA content. Generally the conclusion is that there is no obvious loss by any of the procedures other than can be explained by wash out. It therefore appears that GABA is biochemically and physically stable.

An METC protocol for testing GABA bioavailability from potato and tomato was written and evaluated in draft form. Some suggestions were made to already include data to support the specific sampling times for blood samples. This could not be included in the work plan itself and will now be done in a pilot first. This requirement delayed the submission so far. It is expected to be submitted early 2019 though.

Number of delivered products in 2018 *(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

none	none	none	1
Titles/ description of the most important products in 2018 (5 at max) and their target group			
1. Tessa de Bie, 18-19 januari 2019, Annual meeting of the young investigators of the Dutch Association for Diabetes Research ('jonge NVDO-bijeenkomst') "Effects of oral GABA on glycemic variability and blood pressure in individuals at risk of developing type 2 diabetes and hypertension"			

Appendix: Names of the products or a link to the products on a public website including the link to the project summary on Kennisonline