



<b>General information</b>	
PPP number	<b>TKI-AF-16138</b>
Title	<b><i>Multi-analyte diagnostic methods to detect food pathogens</i></b>
Roadmap/Umbrella	<b>Food Safety</b>
Executive knowledge institution(s)	<b>DLO-FBR, HAN University of Applied Science</b>
Research project leader (name + e-mail address)	<b>Dr. A. van Amerongen (<a href="mailto:aart.vanamerongen@wur.nl">aart.vanamerongen@wur.nl</a>)</b>
Coordinator (on behalf of private parties)	<b>Dr. H. Eickhoff (<a href="mailto:eickhoff@scienion.de">eickhoff@scienion.de</a>)</b>
Government contact person	<b>M.G.M. van Creij</b>
Start date	<b>01-01-2017</b>
End date	<b>31-12-2019</b>

<b>Approval coordinator/consortium</b>	
The coordinator has assessed the annual report on behalf of the consortium:	<input checked="" type="checkbox"/> approved <input type="checkbox"/> rejected
Possible feedback on the annual report:	

<b>Short content description/aim PPS</b>
<b>Food safety is dependent on timely detection of chemical, biological and/or microbial risk factors. In most cases one factor is determined in a single test (e.g. ELISA). In general, at-line lateral flow tests allow the detection of one factor as well. Both in view of the time needed to perform a test and with respect to high costs this is far from efficient. The food diagnostic sector is, therefore, looking for multi-analyte diagnostic devices that can be produced at a large scale and in an economically costs-effective way. DLO/FBR has built up some expertise in the production of multi-analyte lateral flow and ELISA methods. Through the present project and together with Scienion and HAN these diagnostic methods can be further developed to commercially marketable products. The innovation of the new diagnostic devices will also rely on the ultra-low volume dispensing of reagents (down to 50 picoliter) in a microarray of spots that will enable the simultaneous detection of a range of risk factors in a single sample.</b>

<b>Planning and progress</b>	
Is the PPP going according to plan? <sup>1</sup>	On main issues the project is going according to plan. However, DLO-FBR has noticed negative interference of the raw milk sample matrix on assay results. DLO-FBR still works on an appropriate solution to this "interference problem".
Have there been changes in the consortium/project partners?	In 2017 there have been no changes in the consortium/project partners. The possibility exists that ELDC will leave the project in 2018. If this happens, the remaining consortium will look for a new Industrial partner.
Is there a delay and/or deferred delivery date?	Because of the problems with the sample pretreatment (WP1), tasks 3.1 and 3.2 (resp. "Lateral flow and flow through microarray methods" and the "microarray ELISAs" suffer from

<sup>1</sup> If applicable, use the explanation from the financial project report

	delay in time. The consortium works on a solution (alternative enzymatic clearance protocols) for this problem/delay.
Are there any substantive bottlenecks? Provide a brief description	The development of the testmodel micro-ELISA filterplate for <i>Salmonella</i> spp. in raw milk samples, has proven to be problematic due to matrix interferences with the testresults. Development of appropriate sample pretreatment steps in order to diminish such interference, is still subject of research (e.g. enzymatic clearance using different protocols).
Are there any deviations from the projected budget?	There is no official Director's Statement on behalf of ELDC. Possible shortcoming for ELDC's in-kind contribution, will be repaired/compensated in 2018
Do you expect a patent application to arise from this PPP?	No

Current summary of the project for the website Kennisonline

**The consortium is currently working on the development of multi-analyte diagnostic devices. In order to achieve this goal, work has been done on the development of a micro-ELISA in a 96-well filterplate for *Samonella Entritidis* and *S. Typhimurium*. Also the aim to produce such assays at a large scale and in an economically costs-effective way, has been addressed. Finally work has been done on the development of appropriate Reader hardware and necessary software for data processing.**

#### Highlights:

**The consortium has worked on Large Scale ultra low volume dispensing of microarrays. In that respect they**

- **have optimized parameters for ultra-low volume dispensing of capture molecules by adjusting geometry of piezo dispense capillaries and optimizing the surface energy of the glass surface guaranteeing robust dispensing without liquid film formation at the tip of the dispensers.**
- **have initiated setting up the printing technology for processing larger batches of membrane-based material**

**Another topic addressed by the consortium is**

- **the development of the micro-ELISA in a 96-well filterplate for *Salmonella Entritidis* and *S. Typhimurium*. In this topic milk-clearance experiments (centrifugation, enzymatic clearance) have been performed. Different protocols (temperature, pH, enzymes, etc.) will be performed.**
- **the analysis of results with CL2 spotreader from Scienion**

**The consortium has also has worked on the reader software application; in this respect they**

- **ported the NALMIA software application from a Windows application to a Linux application**
- **enhanced the software application by implementing the following features:**
  - **Automated spot detection algorithm by using Guide Spots and information from a GAL-file**
  - **Automated start of measurement detection by detecting the liquid front**
  - **Starting the application from the command line without the need to use the user interface**
  - **Realization of numerous options, such as:**
    - ✓ **averaging the results**
    - ✓ **export to comma seperated file**
    - ✓ **grouping of replicate results**
    - ✓ **adjustable margins for Guide Spot detection**
    - ✓ **plotting of the Guide Spots**
    - ✓ **adjustable liquid front detection delay**
    - ✓ **execution of custom commands on start and finish of the application**

**Next to software development, HAN has built an alternative reader, based on a Windows webcam. In addition, a new illumination stage has been developed and**

**implemented.**

<b>Number of delivered products in 2017</b>			
Academic articles	Reports	Articles in journals	Introductions/workshops
			X

X: An R&D prototype of the lateral flow microarray real time video-reader, was demonstrated by Scienion at the Medica (13-16 November 2017) in Düsseldorf, Germany.

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

<http://www.scienion.com/company/research-projects/multi-analyte-diagnostic-methods-to-detect-food-pathogens/>

<https://www.wur.nl/en/project/AF16138-Multi-analyt-diagnostic-methods-to-detect-food-pathogens.htm>

<https://www.wur.nl/en/Research-Results/kennisonline/AF16138-Multi-analyt-diagnostic-methods-to-detect-food-pathogens.htm>

Akkoord: Hans van der Kolk (Topsectorsecretaris)