



### 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 by 15 February 2019 to Hans van der Kolk

General information	
PPP number	TKI-AF-16138
Title	Multi-analyte diagnostic methods to detect (sub)clinical mastitis in cows
Theme	Food safety (gezond en veilig)
Executive knowledge institution(s)	Wageningen Food & Biobased research (WFBR)
Research project leader (name + e-mail address)	Dr. Aart van Amerongen, aart.vanamerongen@wur.nl
Coordinator (on behalf of private parties)	Dr. Holger Eickhoff, eickhoff@scienion.de
Government contact person	M.G.M. van Creij
Total project size (k€)	480 k€
Address project website	x
Start date	01-01-2017
End date	31-12-2019

### 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:	<input checked="" type="checkbox"/> approved <input type="checkbox"/> rejected
Possible feedback on the annual report:	

### Short content description/aim PPS

Mastitis is an inflammation of the mammary gland and is the most significant cause of economic losses in the modern dairy industry <sup>1</sup>. Direct losses occurring due to mastitis include: costs of medication, veterinary services, discarded milk, and additional care of diseased animals, and in some severe cases, the death of the animal. Indirect losses include: decreased milk yield, decreased milk quality due to changes in milk chemical content, shorter productivity duration of dairy cows, earlier onset of the dry period, and decreased subsidies due to inferior milk quality. Mastitis is also associated with other health disorders in cows, such as reproductive disorders and decreased feed intake, which can be reflected in decreased milk yield. At the laboratory level several diagnostic methods and technologies are available to detect these risk factors. In most cases one factor is determined in a single test (e.g. ELISA). In general, user-friendly at-line (onsite, or point-of-care) 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. In addition, the joint results of single-factor tests will generally be available at a later stage which is undesirable if

<sup>1</sup> Miroslav Benić *et al.* Bovine mastitis: a persistent and evolving problem requiring novel approaches for its control - a review. VETERINARSKI ARHIV 88 (4), 535-557, 2018.

animal health and food quality and safety is concerned.

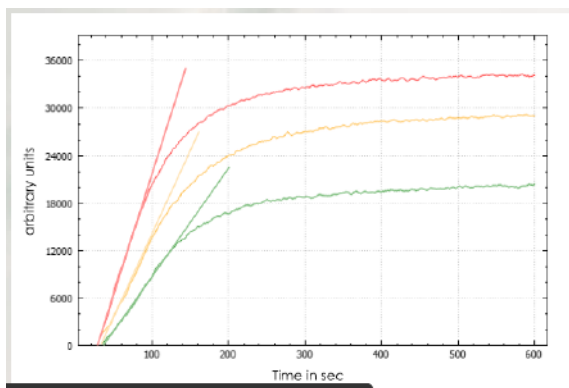
Farmers of milk-producing cows require a proactive diagnostic strategy with respect to their animal's health. User-friendly, onsite and multi-analyte (multi-factorial) diagnostic devices could greatly contribute to monitoring cow's health status with respect to (sub)clinical mastitis. Furthermore, the application of multi-analyte tests will yield a substantial efficiency improvement and costs reduction for farmers. The dairy diagnostic sector is, therefore, looking for multi-analyte diagnostic tests that can be produced at a large scale and in an economically costs-effective way. In this project onsite point-of-care tests for 3 acute phase proteins (APPs) are being developed at WFBR. The format of the assays is a lateral flow microarray immunoassay format. Milk samples are being collected by Global DX, the HAN and Scienion are involved in the development of a portable reader, and furthermore, Scienion is involved in the larger scale preparation of multi-analyte tests.

**Planning and progress** (if there are changes to the project plan, please explain)

Is the PPP going according to plan?	Yes. The project plan has been changed in October 2018 and since then the activities are going according to the project plan.
Have there been changes in the consortium/project partners?	There has been a change in the consortium: Global DX has replaced ELDC. This has been reported in June 2018 (Adapted project plan dated the 27 <sup>th</sup> of June 2018).
Is there a delay and/or deferred delivery date?	No
Are there any substantive bottlenecks?	Difficult to find good antibodies. An extensive search is being performed for suitable antibodies.
Are there any deviations from the projected budget?	No. However, in November 2018, it was approved that the deficit (missing cash) from 2017 can be made up with in-kind contribution in 2018 and 2019.

**Results in 2018/ so far**

- An extensive literature search was performed by WFBR. This literature search resulted in a list of possible acute phase proteins that could be markers of the subclinical and/or clinical state of mastitis. Three of these were chosen.
- For one of the APPs a lateral flow microarray immunoassay was developed. A dose response curve showed a three-order range.
- The reader technology for Lateral flow immunoassays was further optimized regarding:
  - light source
  - data modelling using a Langmuir and Hill equation
- There is a strong indication that semi-quantitative detection is possible.
- Prototypes are available of the sciREADER LF1. With this reader the pixel grey value of spots can be measured kinetically. For quantification the slope of the line can be used (see figure below for an example). These prototypes use an open platform, are fully customizable, are small and portable, and can make use of wireless and wired connections.



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<b>Number of delivered products in 2018 / so far</b> (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
			Scienion and WFBR provided a workshop at the 12 <sup>th</sup> Rapid Methods Europe (RME) conference 5-7 November 2018 in Amsterdam, The Netherlands <a href="https://www.rapidmethods.eu/programme.php">https://www.rapidmethods.eu/programme.php</a>

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

<https://topsectoragrifood.nl/project/multi-analyte-diagnostic-methods-to-detect-food-pathogens/>

<https://www.wur.nl/nl/Onderzoek-Resultaten/Topsectoren/show/Multi-analyst-diagnostic-methods-to-detect-food-pathogens.htm>