EU cofin Project Annual Report 2018

The EU projects that receive co-finance from 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.

General information	
TKI Number of the project	AF-EU-18027
Title	*MOLOKO*
project leader WR (name + e-mail address)	Jeroen Peters (jeroen.peters@wur.nl)
Address project website	http://www.moloko-project.eu/
Start date	January 2018
End date	June 2021

Short description/aim project (this information can be published on a website of the TKI/Topsectors)

The main objective of MOLOKO project is the manufacturing, implementation, and validation of a self-managing and automatic miniaturized integrated photonic sensor to be used as process analytical instrumentation for fast response on-site monitoring for analytes of interest for the security and quality within the milk supply chain.

In particular, the project aims at realizing multiplexing quantitative detection of up to 10 analytes among which food safety parameters, e.g. antibiotics, mycotoxins, bacterial toxins and food quality parameters e.g. lactoferrin and caseins by implementing a highly-integrated optoplasmonic-microfluidic sensor in the strategic checkpoints along the entire supply and value chain of milk. The effectiveness and market-placement of the engineered functional prototype is quantitatively evaluated by direct comparison with respect to standard analytical methods and commercially available optical biosensors.

Planning and progress Is the project going according to plan? Are there any substantive bottlenecks? If yes, please explain with a brief description of the current situation

WP6 - Multiplex Diagnostics started 2 months ahead of the original planning (M2 instead of M4). The project tasks that RIKILT is involved in are ahead of schedule with just minor scientific challenges to solve.

Highlights and deliverables in 2018 / so far (this information can be published on a website of the TKI/Topsectors)

RIKILT made an inventory of available antibodies, antigens and antigen-protein conjugates for MOLOKO target analytes, important for the milk sector, mentioned in the short- and long-term analytes tables. Using a selection of these bio-molecules, RIKILT has developed and optimized monoplex SPR based assays for the detection of the following:

Food safety:
- Aflatoxin M_1
- Tetracyclines
- Quinolones

- Streptomycin

Food Quality:
- Lactoferrin
- κ-Casein
- β-Casein

These assays were all capable of detecting the analytes at relevant concentrations (MRL, food safety and natural occurrence, food quality) besides the aflatoxin M_1 assay.

In 2018, two consortium meetings have been held, one in February in Bologna and one in July in Dresden. Furthermore, RIKILT as Work Package leader made a visit to MOLOKO partner VTT for an additional technical meeting and discussion and to become more aware of each other's activities. The 10 Months review meeting of this project was held in October 2018 in Brussels. The work RIKILT had done was very well received. The project received a good evaluation in general and the commission gave some suggestions for further improvement of the project. Based on the advice of the review commission (M10 Review Meeting) the table with analytes to be detected has been extended and the analytes prioritized by all partners.

The prioritization was mainly based on the practical know-how of the industrial partners PARMALAT and MILKLINE. This means that the short-term and long-term analytes list, in the original MOLOKO proposal, will now be a combined prioritized list. Because of this new prioritized list, RIKILT has started work on the development of a SPR immunoassay for the detection of cGMP in milk. Checking the GMP concentration before unloading the milk trucks can reduce the waste of the final product and customers complaints (thus avoiding recalling products from the market). Due to the unavailability of a commercial cGMP reference protein, RIKILT has started to produce and purify cGMP through enzymatic cleavage of k-casein.

Furthermore, RIKILT has ordered antibodies and antigens for the set-up of a SPR immunoassay for the detection of β-casein and is able to differentiate between the A1 and A2 forms in milk. Milk Companies all over the world are evaluating the possibilities to create a market for milk made only by A2A2 β-casein cows, A2 milk. The current analytes list contains 13 analytes of which a maximum of 10 analytes will make it to the final sensor-chips. This means analytes 11-13 (quinolones, sulphonamides and streptomycin) are now considered as optional assays.

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
Titles/ description of the most important products in 2018 (5 at max) and their target group			

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

http://www.moloko-project.eu/

EN: https://www.wur.nl/en/Research-Results/kennisonline/AF-EU-18027-MOLOKO.htm
NL: https://www.wur.nl/nl/Onderzoek-Resultaten/Onderzoeksprojecten-LNV/Expertisegebieden/kennisonline/AF-EU-18027-MOLOKO-1.htm