Memorandum

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To
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From
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Subject
Cheap and easy-to-use aflatoxin B1 detection in food products.

Date
28 September 2016

Our reference
<vnr-ext>

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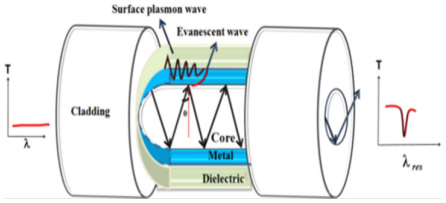
Background: TNO is a Dutch Science & Technology organization (www.tno.nl) with about 3000 employees and a very broad expertise in sensor technology, food, food chain, analytics and risk analysis.
In the sensor technology department at TNO there is a broad experience in optical techniques for (bio-) chemical analysis, ranging from concept development, feasibility unto pilot plant product development.

For the challenge at hand for PACA (rapid and cheap mycotoxin analysis), our starting point is the competitive immuno-assay, developed at the *Uganda Industrial Research Institute* by Alex Paul Wacoo. This assay is based on a plated Ag-cysteine coating and a readout by means of cyclic voltammetry.
At TNO there is a thorough expertise in the development of biosensors for mycotoxines. First results in this field were based on SPR analysis in food extracts, applying an laboratory instrument from Biacore (see poster and article). In a follow- up development step this lab analysis was transferred to a miniaturized SPR readout (see picture) and currently we are applying SPR at the tip of an optical fiber, enabling rapid, easy and cheap detection.
The Ag-cysteine based assay could be transferred to such a detection platform in cooperation with Alex Paul Wacoo, who is now a PhD at the VU Amsterdam, located in Uganda Industrial Research Institute, Kampala, with Prof Remco Kort (TNO) as his promotor.

Another, perhaps much more attractive, approach is to convert the Ag-cysteine system into a sensor with a colorimetric readout, enabling visual detection at a semi-quantitative level. In terms of easy-of-use and costs, this will be the ultimate solution for detection Aflatoxin B1 in agricultural products, like e.g. peanuts, at the production site in Africa.
If only a result is required in terms of examining whether or not the contamination level in a product is above or below a certain limit (e.g. 10 ppb for aflatoxin), it could be worthwhile to consider also the specific interactions of aflatoxin B1 with modified silver surfaces resulting in a change of fluorescence or color that can be observed by the human eye.
The development of such optical detection systems is a key expertise at TNO.



Fiber SPR

Proposition

- Development of an easy-to-use sensor system for aflatoxin B1 in food products that can be used at the production site
- Development of a reliable method for statistical sampling
- Training of end-user