**Bead-based multiplex technology for the simultaneous, fast and portable on-site detection of different food contaminants**

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RIKILT has a long history in developing and validating immunoassays for the detection of food and feed contaminants. More recently bead-based multiplex immunoassays were developed for mycotoxins polycyclic aromatic hydrocarbons, coccidiostats, pesticides and antibiotics.

The developed 6-plex mycotoxin screening assay allows easy and rapid multiplex detection of the target mycotoxins in barley according to EU legislation. This was proven by a within-laboratory validation using blank and fortified barley samples. With a cut off factor of 50%, based on the EU maximum levels, we were able to screen at 2 µg/kg for aflatoxin B1, 2.5 µg/kg for ochratoxin A, 625 µg/kg for deoxynivalenol, 50 µg/kg for zearalenone, 1000 µg/kg for fumonisin B1 and 25 µg/kg for T-2 toxin. The in-house validated mycotoxin 6-plex was also applied as a screening tool for mycotoxins in beer samples.

Currently our antibiotics MAGPIX multiplex uses 16 beads and enables detection of over 80 different antibiotics of different antibiotic classes. Validation of this antibiotics multiplex was carried out for water, milk, urine and slurry samples and showed that this multiplex is sensitive, i.e. most antibiotics can be detected at levels well below 10 ng/mL in water and milk. New relevant antibiotic targets are still being added as well as other relevant contaminants depending on the matrices. Moreover, this antibiotics multiplex was combined with a coccidiostats multiplex. Assays were carried out on-site after transport of the MAGPIX machine (in the back of a car). Additionally, simplifications were introduced to make the assays even more suitable for on-site and point of care analysis, i.e. sample extractions of just 1 minute, addition of extracts by disposable fixed volume micropipettes and addition of pre-mixed reagents from dropper bottles.