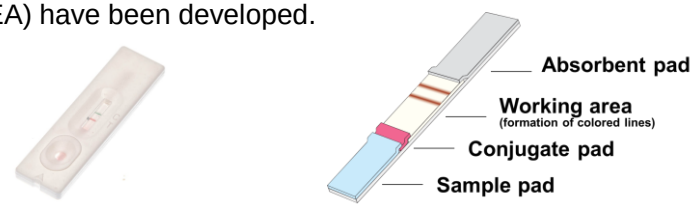
Efficient rapid immunochemical tests for mycotoxins detection in foods

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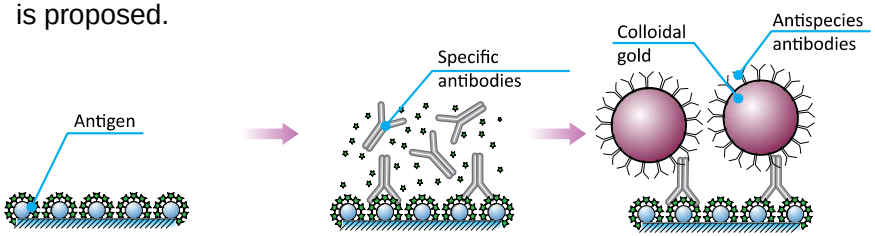
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Mycotoxins are one of the priority classes of agricultural products contaminants. They pose a significant danger to human and animal health. For productive monitoring of these toxic contaminants new formats of immunochromatographic (ICA) and immunoenzyme assays (IEA) have been developed.



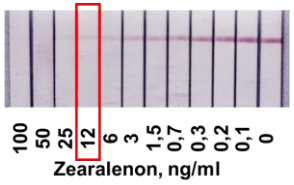
Appearance and scheme of immunochromatographic test.

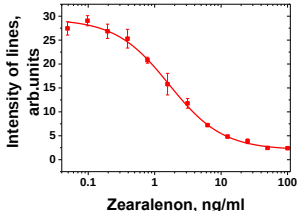
For highly sensitive detection in indirect labeling ICA, the combination of non-modified specific antibodies and colloidal gold nanoparticles-labeled anti-species antibodies (anti-IgG-GNP) is proposed.



Scheme of analysis with indirect labeling.

This approach allows decreasing limits of detection in 10-20 times (for example, for zearalenone to 350 pg/ml). The assay duration varies from 10 to 20 min.

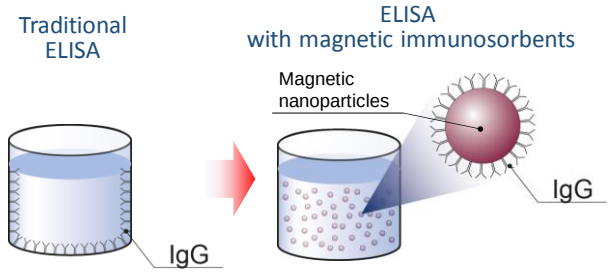




Results

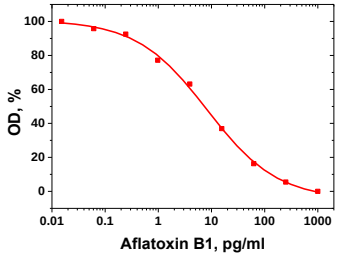
Urusov, A. E., Petrakova, A. V., Zherdev, A. V., & Dzantiev, B. B. (2016). Biosensors and Bioelectronics, 86, 575-579.

For ELISA, the use of immunosorbents based on magnetic nanoparticles is proposed. The given approach allows concentrating the analyte and performing immunochemical interactions in homogeneous, diffusion-independent mode, thereby reducing the detection limit and the duration of the analysis.



Scheme of analysis with magnetic immunosorbents.

The total ELISA duration is reduced by 3-4 times - up to 20-30 min (with 5-min specific immune interaction). The limit of detection is decreased on an order of magnitude as compared with common heterogeneous microplate ELISA, accounting, for example, 2 pg/ml for aflatoxin B1.



2 pg/ml **45 min** **CH_3OH 30%**

Results

The developed assays for aflatoxin B1, ochratoxin A, zearalenone and T2-toxin ensure 90% or higher revealing the analytes in cereals, thus indicating prospects of the proposed approaches.

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Urusov AE, Zherdev AV, Petrakova AV, Sadykhov EG, Koroleva OV, Dzantiev BB (2015) Rapid multiple immunoenzyme assay of mycotoxins. Toxins, 7(2): 238-254.