Rapid immunochemical test systems for food safety control: New solutions with increased sensitivity

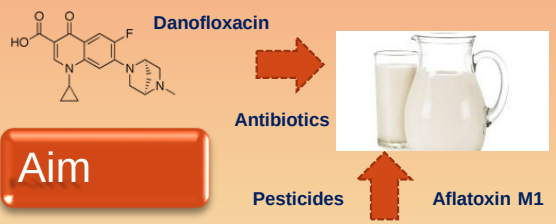
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Introduction

A presence of toxic contaminants in food and feed is a complex problem combining health hazards for men and animals with economic harm to agriculture. Negative effects of these compounds include inhibition of protein synthesis, immunosuppression, toxic effects, allergic reactions. Therefore, monitoring of these compounds in foodstuffs is extremely important task.

Among different analytical techniques, immunochemical methods are considered promising due to their high specificity, sensitivity and possibility of high productive screening measurements.



Aim

The study was focused on immunodetection of main toxicants (veterinary drugs, pesticides, mycotoxins) in milk and dairy products.

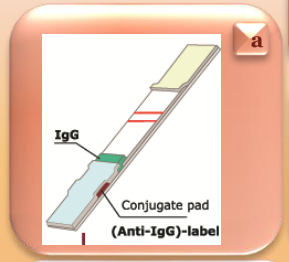
Materials & Methods

Fluorescence polarization immuno-assays (FPIAs) and immuno-chromatographic analysis (ICA) have been developed and characterized for detection of toxic contaminants. Conjugates of antigens' derivatives with fluorescent labels and antibodies with gold nanoparticles and quantum dots were synthesized and used for the assays.

Results & Discussion

Concentration and kinetic dependences of the analytical interactions were studied and the optimal modes of assays implementation were determined. For example, monoclonal antibodies to lincomycin and tylosin were characterized by low cross-reactivity (< 0.01%) with respect to structural analogues and antibiotics of other groups. In contrast, polyclonal antibodies against danofloxacin and moxifloxacin allowed detection of 12 antibiotics belonging to the fluoroquinolone group.

Graphs



a: Scheme of indirect format of ICA ; b: Fluorescent labels; c, d: Calibration curves for Lincomycin

Conclusion

The developed test-systems were successfully applied for detection of antibiotics, pesticides and mycotoxins in milk and dairy products.

Acknowledgements

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