

Point of care solution

for toxins and pathogens such as endotoxins, viruses or miRNA in solutions

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IDEA

Fast and inexpensive on-site analysis for medically relevant substances, which until now have usually been detected in the laboratory at great expense.



PROOF OF CONCEPT

The principle has been established in preliminary work as a highly specific detection for glyphosate. The technology is an extension to medical diagnostic applications.



NEXT STEPS

Expansion of a platform technology for use in medical technology with extension to microRNA, viruses, metal ions and endotoxins.



STATE OF THE ART

Existing measurement methods are

- not feasible on-site, but only in the laboratory (e.g.: ELISA, MS or HPLC)
- cost-intensive
- time-consuming

TECHNOLOGY / SOLUTION

We have developed a mobile rapid test for applications in environmental analysis, the principle of which can also be applied to viruses and other pollutants or pathogens.

1. The surface of hydrogel microparticles is modified with biomolecules.
2. The transparent chip surface is modified with further biomolecules.
3. The analyte molecules such as viruses, metal ions or endotoxins in the (aqueous) solution mediate the binding between the modified hydrogel particles and the chip surface in a concentration-dependent and highly selective manner.
4. Depending on the analyte concentration, the contact areas of the hydrogel particles on the chip surface vary in size and can be read optically.

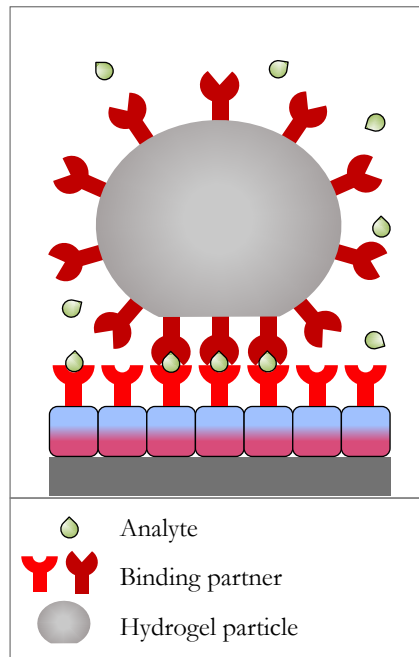
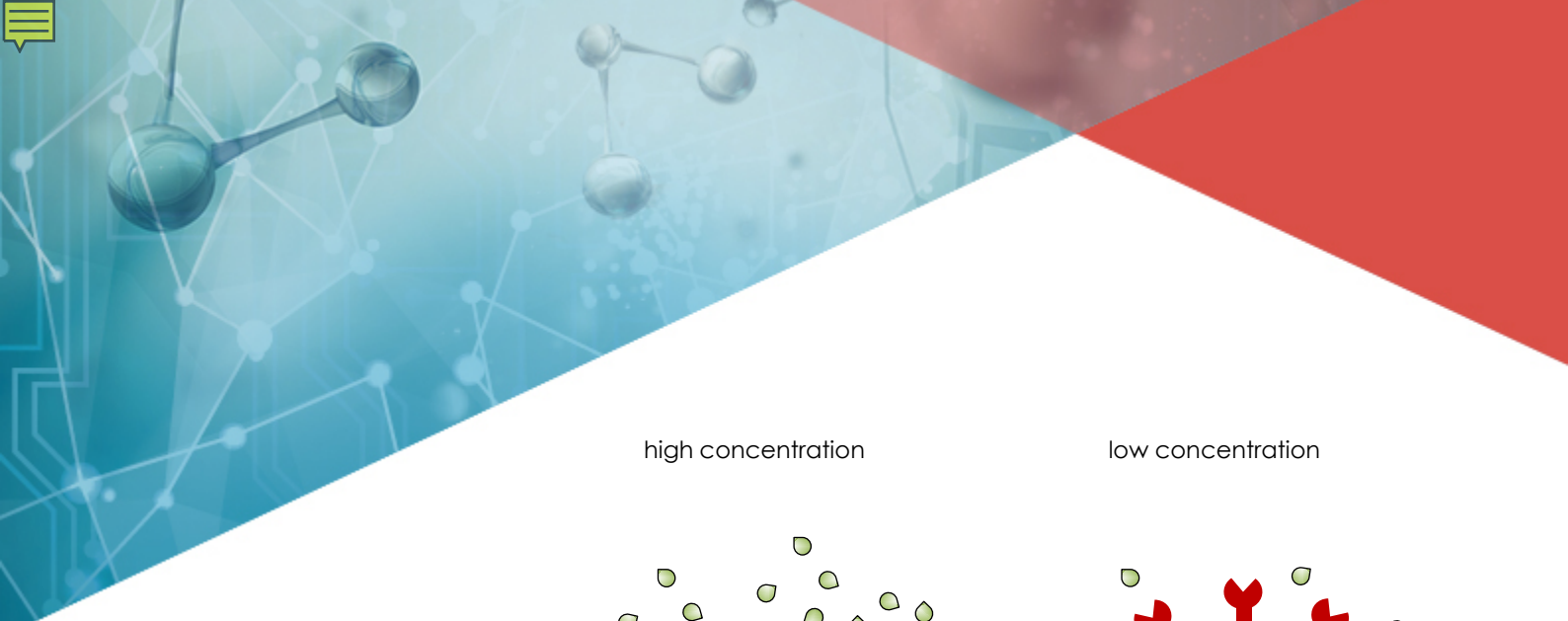


Figure 1

Schematic detection principle with functionalized hydrogel microparticle and chip surface



ADVANTAGES

- On site-determination as small and mobile tool
- Easy handling
- Fast measurement (minutes)
- Highly sensitive
- Highly selective due to biospecific binding (no signal influence by other substances)
- Inexpensive due to simple optical readout method
- Non-toxic and inexpensive consumables

APPLICATION EXAMPLES

Concentration determination of

- Glyphosate, estrogens or bisphenol A in environmental samples (in development, patents below).
- Copper: detection principle confirmed in the laboratory
- ssDNA or microRNA without PCR in point of care solutions
- Toxins and pathogens in food, feed, cosmetic or pharmaceutical samples (future)

REFERENCES

Pussak et al. Angew. Chem. Int. (2013)
Rettke et. al. Biosens. Bioelectron. (2020)
 PCT/EP2019/081614
 DE 10 2020 101 223.3

"This measure is co-financed by tax funds based on the budget approved by the members of the Saxon Parliament."

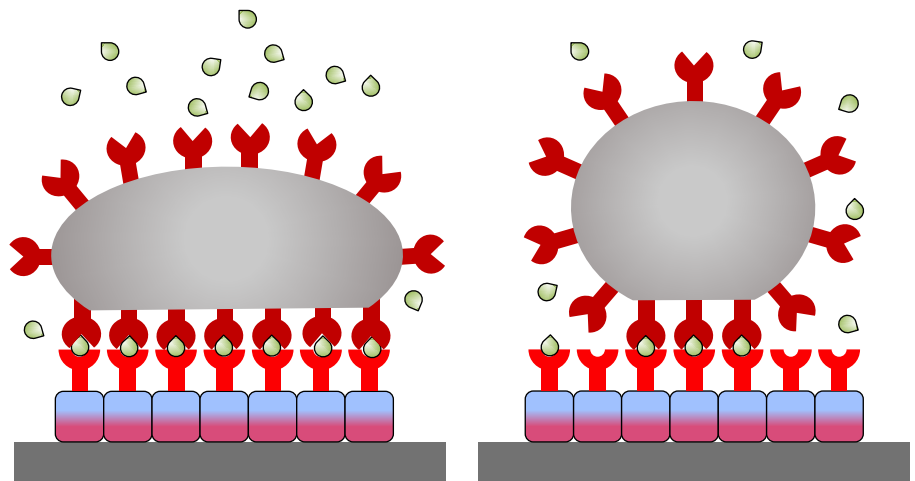


Figure 2
Schematic representation of the concentration-dependent particle deformation.

PATENT

Application:
DE 10 2020 124 279.4

OPPORTUNITIES

R&D Collaboration
Licensing
Transfer of property rights

NEXT STEPS IN DEVELOPMENT

Completion of demonstrator
Validations for various analytes
Extension of application

FUNDING

The development is currently being further developed as part of a project with IfU GmbH, Anvajo GmbH with funding from EFRE and the Free State of Saxony.

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