



Glyphosate-Quick-Test

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IDEA

Fast and inexpensive on-site analysis for anthropogenic trace substances in water and food



PROOF OF CONCEPT

Highly specific detection of glyphosate in aqueous solutions in the range of 100 pM (meets legal pesticide limits in drinking water of 0.1 µg/l)



NEXT STEPS

Extension of technology to other analytes, such as hormonally active substances and antibiotics

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Validation of measurements



PROBLEM

- Current methods cannot be performed on-site but only in laboratories (e.g.: ELISA, MS or HPLC)
- Current methods are cost-intensive
- Current methods are time consuming

TECHNOLOGY / SOLUTION

1. The surface of hydrogel microparticles is modified with glyphosate.
2. The transparent chip surface is modified with the natural binding partner, the enzyme EPSPS (enzyme inhibited by glyphosate).
3. Glyphosate molecules in the (aqueous) solution bind concentration-dependent and highly selective to the chip surface in competition to the modified hydrogel microparticles.
4. Depending on the glyphosate concentration in the solution, the contact areas of the hydrogel microparticles on the chip surface vary in size. This enables a highly sensitive optical determination of the analyte concentration (glyphosate).

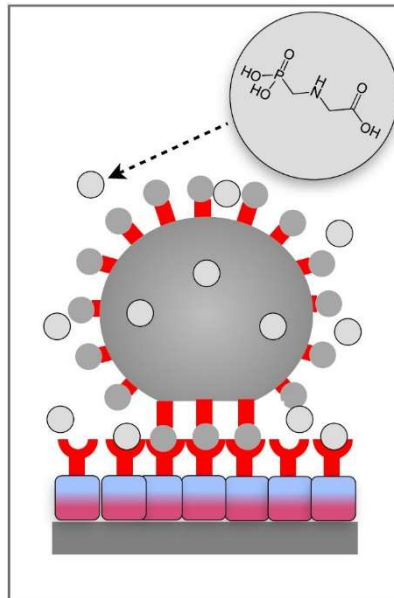


Figure:

Schematic detection principle with functionalized hydrogel microparticle and chip surface

„This measure is co-financed by tax revenue on the basis of the budget adopted by the members of the Saxon state parliament.“



IP DE 10 2018 130 134.0

TECHNOLOGY-OFFER

ADVANTAGES

- Determination is possible directly on-site, because of small and mobile setup
- Easy handling
- Very fast measurement
- Highly sensitive (adjustable up to pM measuring ranges)
- Highly selective due to biospecific binding (no signal influence by other substances)
- Inexpensive due to simple optical readout method
- Non-toxic and inexpensive consumables

DETECTION LIMIT / SELECTIVITY

- First measurements show a detection limit in aqueous buffers in the range 100 pM / 0.1 µg/L (see figure).
- The measuring principle is selective for glyphosate even against various pesticides and structurally similar substances (e.g. glufosinate, AMPA)

REFERENCES / LITERATURE

Pussak et al. *Angew. Chem. Int.* (2013)

Rettke et al. (2020)

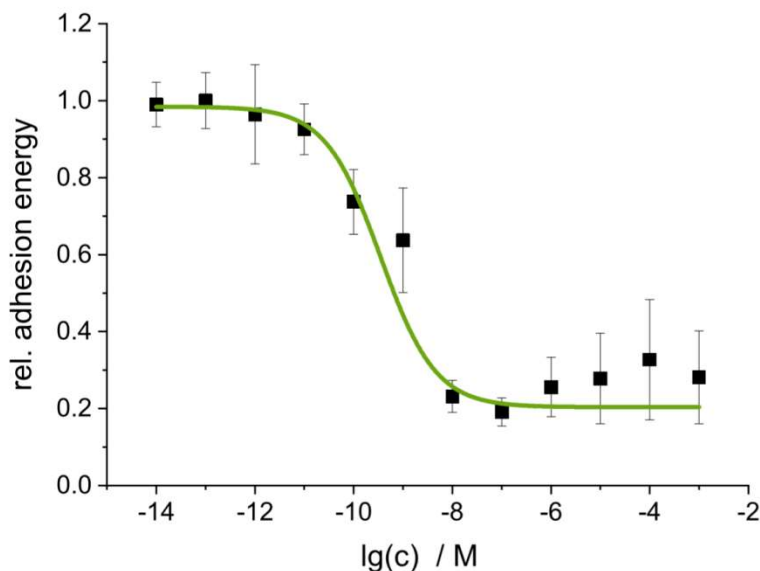


Figure:

Example of detection sensitivity of glyphosate in aqueous solution

PATENT STATUS

Patent pending
DE 10 2018 130 134.0

COOPERATION POSSIBILITIES

R&D cooperation
Licensing
Contractual agreements for use
Transfer of property rights

NEXT STEPS

Development Demonstrator
Product development / validation
Application extension

FUNDING

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

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„Diese Maßnahme wird mitfinanziert durch Steuermittel auf der Grundlage des von den Abgeordneten des Sächsischen Landtages beschlossenen Haushaltes.“

