

Pesticide Detoxification in a Fungal Biobed

Concept & Effectivity

JenaBios GmbH

- Founded in 1998 by scientists of the university of Jena
- Integrated in an alliance of 5 companies employed in the fields of molecular biology, DNA-diagnostics as well as analytics of food and animal feed
- Production and distribution of a variety of ligninolytic enzymes from fungi, e.g. peroxidases, laccase
- Development of production processes for fungal enzymes
- Ecotoxicity testing

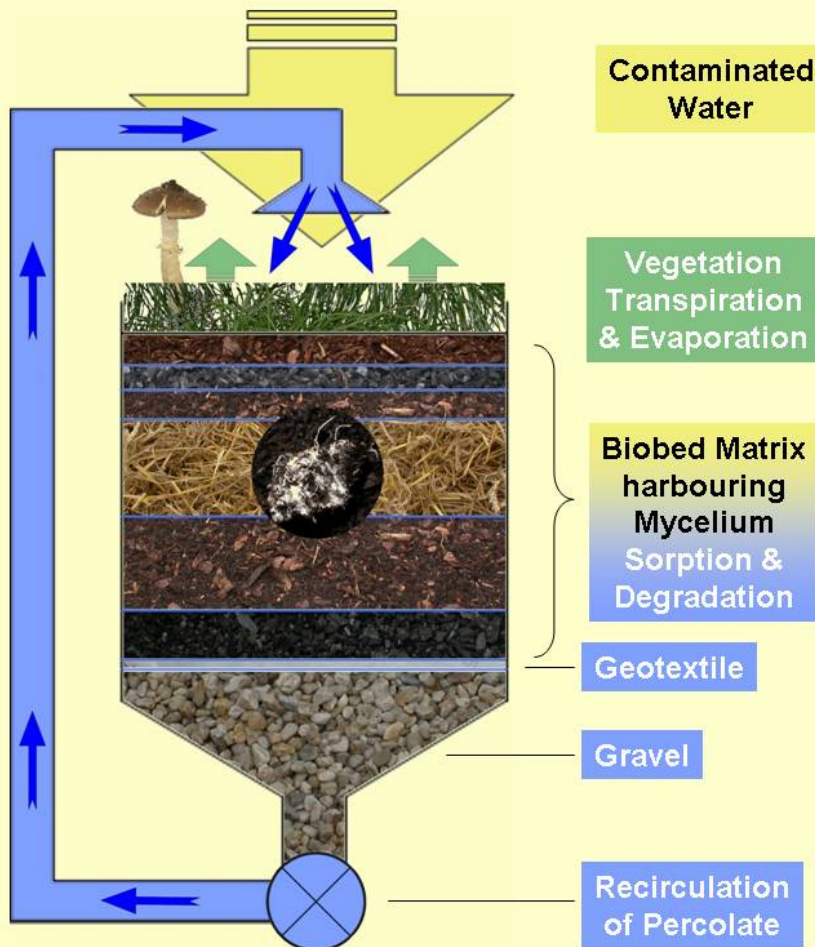
Concept of our Biobed Project

Supported by a grant from **AiF „Otto von Guericke“ e.V.** in a joint project consisting of

- **IHI Zittau** (Prof. Hofrichter): selection of optimal fungal strain with focus on pesticide degradation capability and competitiveness in a non-sterile environment
- **JenaBios GmbH**: biobed design, experiments in laboratory (5 litres) and user scale (1 m³) in cooperation with a local vegetable grower, ecotoxicity testing
- **Biologische Bundesanstalt Berlin** (Dr. Felgentreu): Investigation with residual pesticide solutions from municipal weed control and field crop experiments

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Design of the Fungal Biobed



- White rot fungus provides preliminary disintegration of complex molecules prior to degradation by autochthonous microflora
- No anoxic zone
- Recirculation of effluent until complete evapo-transpiration and pesticide breakdown

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Laboratory Scale Experiments



5-l-Biobeds, A-E: containing pesticides, F: water control

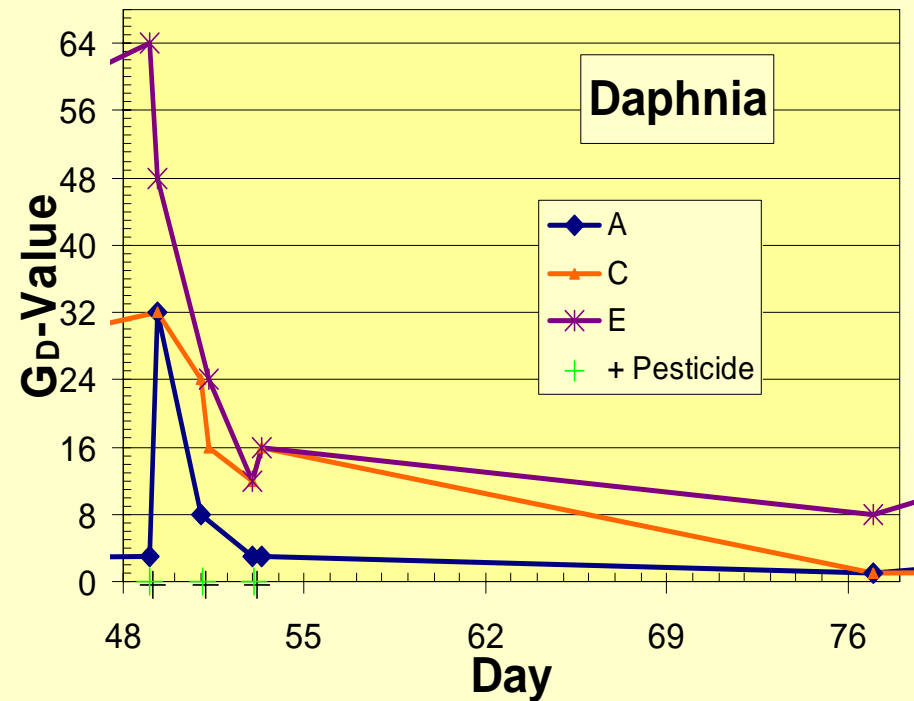
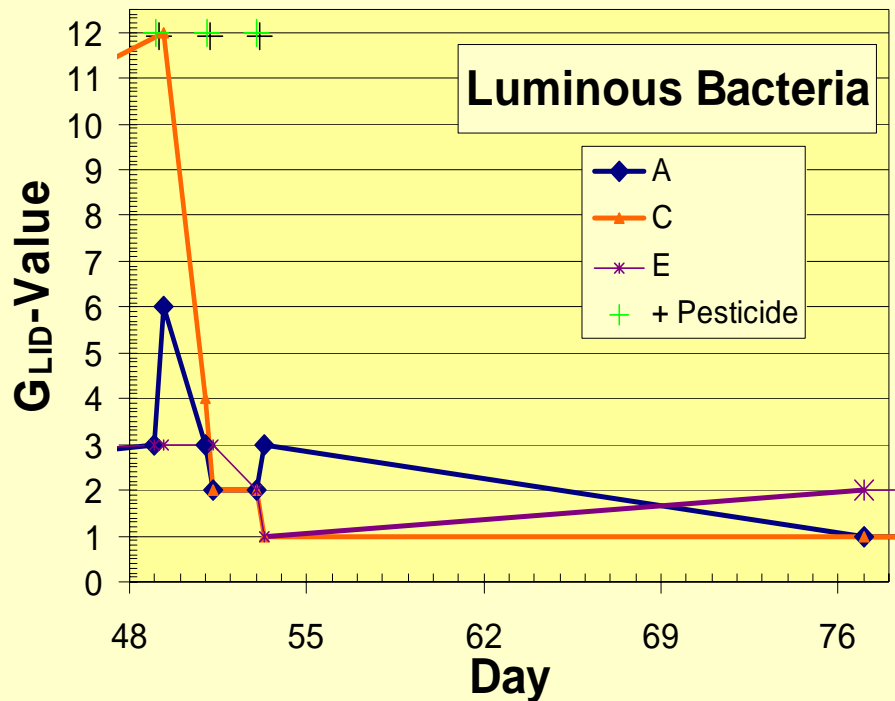
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User Scale Biobeds



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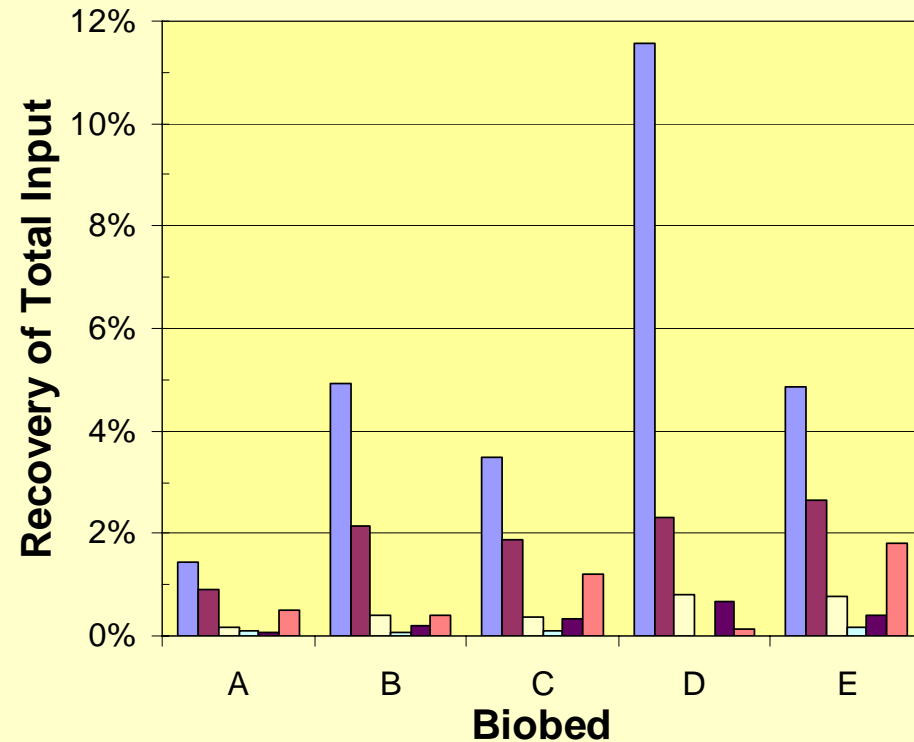
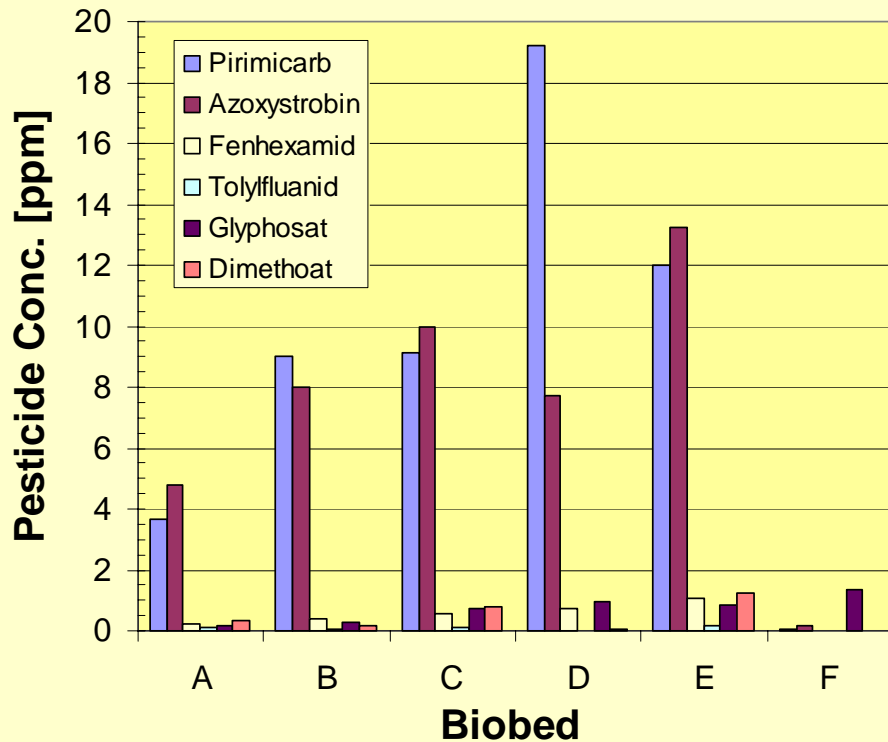
Laboratory Scale Toxicity in the Percolate



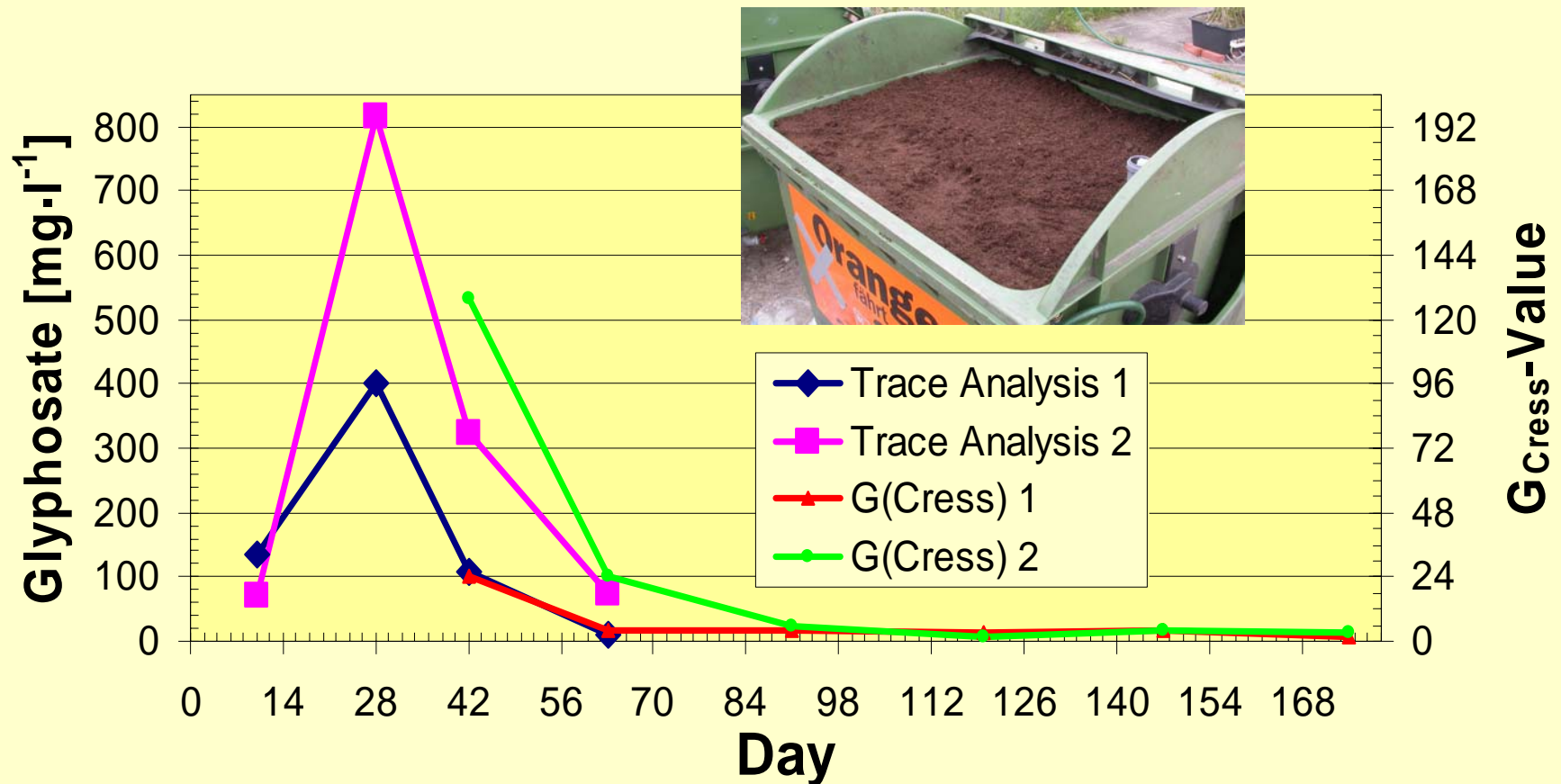
G-Values of added pesticide: $G_{LID} = 12$, $G_D = 512$

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Laboratory Scale Trace Analysis in Compost



Percolate: Trace Analysis – Ecotoxicity Testing with Glyphosate



Summary

- **Complete detoxification of pesticides possible**
- **Life cycle of fungus limits life span of biobed**
- **Application of enzyme solution instead of living fungus offers more degrees of freedom, e.g. in pH value, substrate and microflora composition, or type of enzyme, and allows operation even with compounds that affect fungi**
- **Complete elimination of water avoids wastewater**
- **Cheap control of effectiveness by ecotoxicity testing**
- **Further information via info@jenabios.de**