Kaestner, M., **Nowak, K.**, Brock, A.L., **Miltner, A.**, Schaeffer, A., Trapp, S. (2018): Classification and modelling of non-extractable residues (NER) formation from pesticides in soil
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ABSTRACT SYMPOSIUM NAME: Non-Extractable Residue (NER) Bio-Accessibility & Potential Risks (Oral)

ABSTRACT SYMPOSIUM PROGRAM AREA NAME: AGRO

CONTROL ID: 2981515

PRESENTATION TYPE: Oral Only : Do not consider for Sci-Mix

TITLE: Classification and modelling of non-extractable residues (NER) formation from pesticides in soil.

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ABSTRACT BODY:

Abstract: This presentation provides a comprehensive overview about the formation of non-extractable residues (NER) from organic pesticides and contaminants in soil and tries classifying the different types. Anthropogenic organic chemicals are deliberately (e.g. pesticides) or unintentionally (e.g. polyaromatic hydrocarbons [PAH], chlorinated solvents, pharmaceuticals) released in major amounts to nearly all compartments of the environment.
Soils and sediments as complex matrices provide a wide variety of binding sites and are the major sinks for these compounds. Many of the xenobiotics entering soil undergo turnover processes and can be volatilised, leached to the groundwater, degraded by microorganisms or taken up and enriched by living organisms. Xenobiotic NER may be derived from parent compounds and primary metabolites that are sequestered (sorbed or entrapped) within the soil organic matter (type I) or can be covalently bound (type II, Fig. 1). Both types may pose a considerable environmental risk of potential release. However, NER resulting from elevated biodegradation, which means the conversion of carbon (or nitrogen) from the compounds into microbial biomass molecules during microbial degradation (type III, bioNER), do not pose any risk (Fig. 1, 2). Experimental and analytical approaches to clearly distinguish between the types are provided and a model to prospectively estimate their fate in soil is proposed.

Kaestner M, Nowak KM, Miltner A, Trapp S, Schaaeffer A. 2014. Classification and modelling of non-extractable residue (NER) formation of xenobiotics in soil - a synthesis. Crit. Rev. Environ. Sci. Technol. 44 (19), 2107 - 2171.

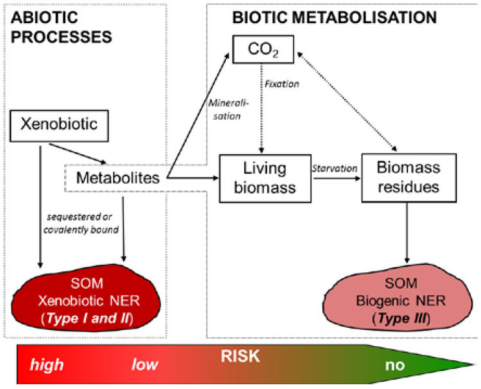

Fig. 1: Different paths of NER formation in soil

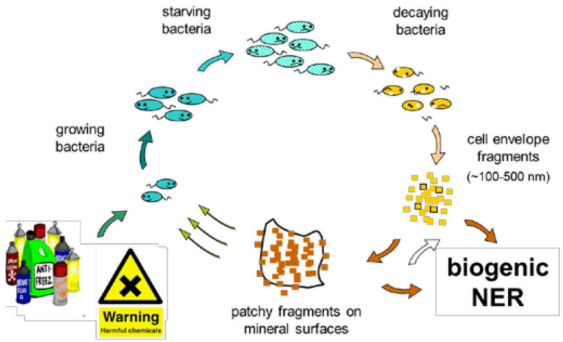

Fig. 2: Incorporation of pollutant-derived C into microbial biomass and soil organic matter