Design of tailored DegT50 field studies

EFSA technical stakeholder meeting, Parma 17-18 June 2014

STUDY DESIGN OBJECTIVE

Enable field $DegT50_{matrix}$ to be reliably estimated

- All processes that can affect the fate of the chemical, except the formation within the soil matrix of transformation products or bound (not extracted) residues (such as leaching, volatilisation, soil surface photolysis, runoff and plant uptake) need to be minimised as far as is practical

ELEMENTS COMMON TO SOIL DISSIPATION STUDIES

- For most aspects, guidance for carrying out field dissipation experiments specified in NAFTA, 2006 is equally applicable to experimental plots used to derive DegT50 with the notable exceptions on the following slides:

SPECIFIC DESIGN NEEDED FOR DEGT50$_{MATRIX}$

- Test substance should be prepared / formulated so it can be evenly applied to the bare ground of test plots, so that variation in mass of test substance applied per unit area is minimised
- The preparation / formulation does not need to be a typical end use product
- Following a single application to the soil surface or injection into the top layer, the test substance should be incorporated by physical mixing over a target depth of 7cm or by the application of irrigation. Alternatively a layer of commercial fine sand can be evenly applied to the soil surface to achieve a minimum sand depth of 3mm

SPECIFIC DESIGN NEEDED FOR DEGT50$_{MATRIX}$

- Plots should be maintained bare when plant uptake cannot be excluded as a significant route of dissipation
- If plant uptake can be excluded, sub plots can be seeded with grass
- If grassed sub plots are prepared, maintained bare sub plots should also be prepared
- In all cases the first soil sampling should take place immediately after the incorporation, irrigation or covering has taken place

SPECIFIC DESIGN NEEDED FOR DEGT50$_{MATRIX}$

- Test plots should be level without any slope
- Sites with soil characteristics (typically course textured low organic carbon content) which would facilitate significant movement of substances of interest out of the microbially active topsoil should be avoided
- Plots may be irrigated, irrigation amounts applied should aim to keep soil moisture contents in the top 30cm below field capacity, reasons for irrigation are:
  - to move the test substance into the soil matrix immediately after application (when this is the method for incorporation)
  - to facilitate soil core sampling (eg. high clay content top soils become like cement when dry)
  - to sustain the grass in grassed sub plots
  - to optimise (shorten) study durations i.e. sustain microbial transformation during dry periods

SPECIFIC DESIGN NEEDED FOR DEGT50$_{MATRIX}$

- Soil sampling should usually proceed to a depth of at least 1m. Depth segments should continue to be analysed until the depth is reached where a segment no longer contains detectable amounts of the compound/s of interest
- As in a basic dissipation experiment all samples from one subplot and the same depth segment are mixed before analysis
- Total mass of moist soil from each mixed sample should be recorded to facilitate the accurate assessment of the compound(s) mass per surface area present at each sampling time in each sub plot

EVALUATION OF RESULTS TO OBTAIN DEGT50$_{MATRIX}$

- The results of mass per unit area with time for each site should be fitted using FOCUS degradation kinetics guidance for modelling endpoints, to obtain the DegT50(s) and kinetic formation fraction(s) for each trial site
- If grassed sub plots were used two DegT50$_{matrix}$ are determined per site, 1st for bare subplots, 2nd for grassed sub plots
- The use of time step normalisation as described in FOCUS degradation kinetics guidance is prescribed