# Beyond SFO? Residue decline on food in birds & mammals risk assessments

Meet us at booth 25

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## Introduction

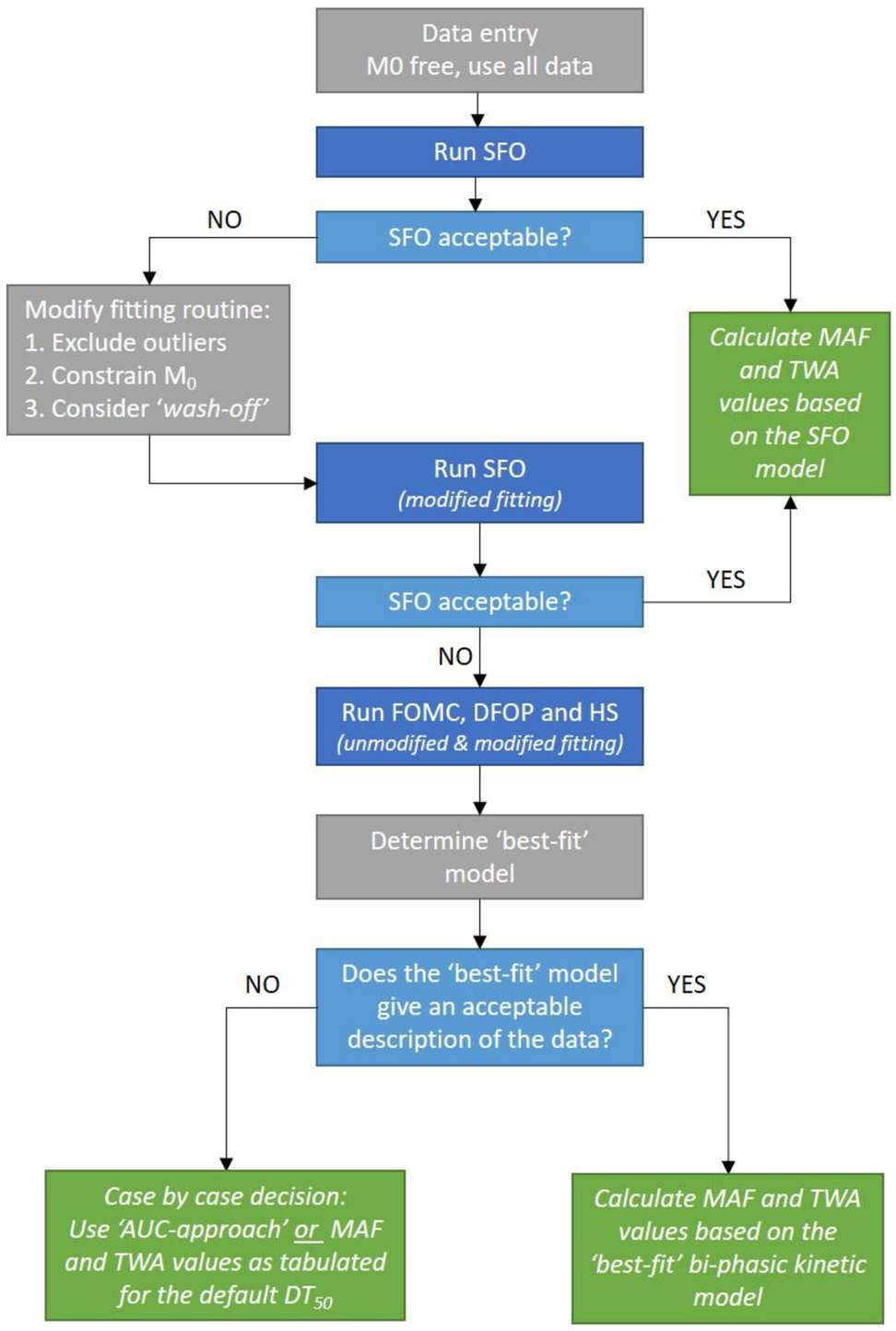
For wildlife risk assessments, the Guidance Document on Risk Assessment for Birds and Mammals (EFSA 2009) provides a default $DT_{50}$ of 10 days for food items like arthropods and vegetation. It also offers refinement options for higher tier birds and mammals risk assessments. Due to the influence of biotic and abiotic factors (e.g. rain), it is very common that the residue decline observed in these studies does not follow single first order kinetics. So far, this issue is addressed using an 'Area Under the Curve' (AUC) approach, as suggested in the guidance document. However, this approach has often been rejected by authorities. Due to the lack of guidance on kinetic evaluation of residue decline in wildlife risk assessments, European authorities tend to refer to the corresponding guidance used to obtain first tier modelling endpoints for the environmental fate risk assessment (FOCUS 2014). The derivation of first tier modelling endpoints within the environmental fate risk assessment is strongly focused on conservative worst case use scenarios, whereas higher tier wildlife residue studies could make the risk assessment more realistic. Therefore, a decision tree for the kinetic evaluation of wildlife residue decline studies, including options to address 'wash-off' from plant surfaces and bi-phasic degradation behaviour is presented.

## Assumptions

**Proposed approach for kinetic analysis of wildlife residues data from field trials considering biotic and abiotic factors**

- Consideration of 'wash-off' from plant surface or arthropods during rain events to make use of all measured data:
  - constant 'wash-off' value per rain event, which will be fitted together with other dissipation parameters
  - wash-off value from current EFSA guideline (2017)
  - Modelled 'wash-off' values estimated with e.g. FOCUS PEARL 4.4.4 model using available weather data
- Inclusion of bi-phasic kinetic models and selection of the 'best-fit model' for a more realistic risk assessment.
- Calculation of *MAF* and *TWA* values based on the actual 'best-fit model'.
- Calculations can be performed with available environmental fate tools. However, more accurate and realistic tools specific to ecotoxicological assessments should be developed.
- Appropriate statistical trigger values have to be discussed, because of high variance of data due to influence of many impact factors.

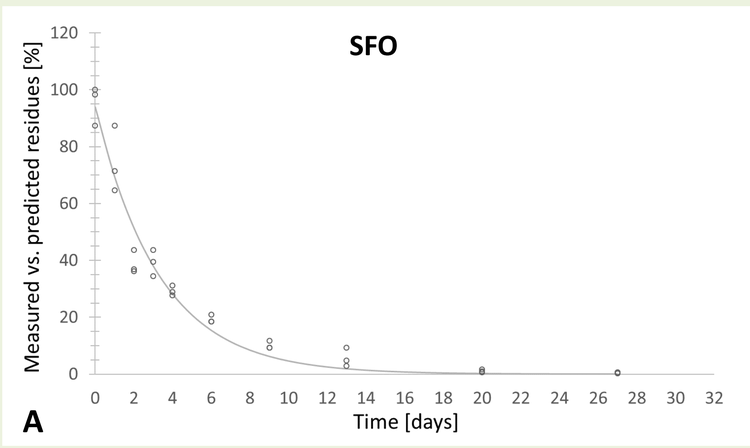
## Decision tree

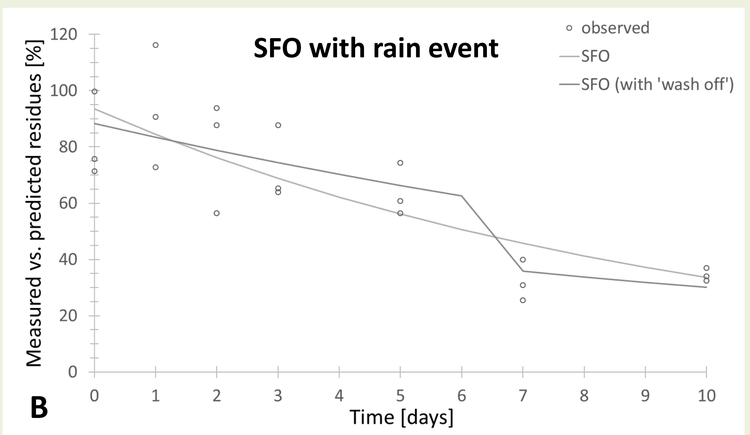


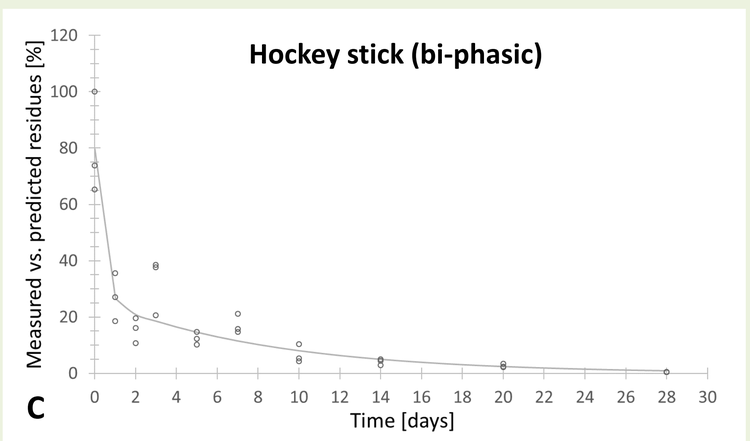

**Abbreviations:**

MAF: Multi-Application Factor
TWA: Time-Weighted Average
AUC: Area Under the Curve
SFO: Single-First-Order model
FOMC: First-Order Multi-Compartment model
DFOP: Double-First-Order in Parallel model
HS: Hockey Stick model

## Examples of kinetic analysis




**A:** Data set, where SFO was best fit kinetic ($\chi^2_{(SFO)}$ = 12.3 %)
**B:** SFO corrected for rain event ($\chi^2_{(SFO)}$= 10.4 %, $\chi^2_{(SFO,\ wash\ off)}$= 8.4 %)
**C**: Bi-phasic hockey stick best fit kinetic ($\chi^2$= 22.0 %)

## Conclusion

- The Guidance Document on Risk Assessment for Birds and Mammals (EFSA 2009) needs an update to consider actual kinetic evaluations of dissipation processes in wildlife food items.
- Using correction factors for rain events, and for overall $DT_{50}$ for bi-phasic decline is more realistic in the higher tier risk assessment.
- The best-fit model needs to be integrated in the MAF and TWA calculations.
- Specific tools should be developed or available environmental fate tools should be adapted.

Arthropod sampling after inventory spray

Vegetation sampling

**REFERENCES**

EFSA (2009). Guidance Document on Risk Assessment for Birds & Mammals EFSA Journal 7: 1438 EFSA (2017). Guidance Document for predicting environmental concentrations of active substances of plant protection products and transformation products of these active substances in soil. EFSA Journal 2017;15(10):4982 FOCUS (2014). Generic Guidance for Estimating Persistence and Degradation Kinetics from Environmental Fate Studies on Pesticide in EU Registration. Version 1.1

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