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Engineering & Scientific Consulting

Pesticide Behaviour in Soils, Water and Air
York, 31 August - 02 September 2022, P-39

FOCUS SW REPAIR – Stage 2 testing
Test design and purpose

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Introduction

- The European Food Safety Authority (EFSA) has recently been working on the repair action of the FOCUS surface water assessment. The purpose of this action was to prepare a scientific and technical report for updating the current FOCUS surface water report as well as a technical update of the corresponding models.
  - Stage 2 is conducted to assess performance for a wide range of simulated challenges (efate, GAP and use representation including a range of specific timing challenges) to ensure more confident release. This testing also supports development of a baseline for exposure that can be referred back to with every subsequent adjustment of processes and software. In this case, simulations are compared with a preceding baseline based upon the current official release of FOCUS SW. Stage 1 and 2 testing is carried out under the remit of the FOCUS Version Control Group with stage 2 activity being sponsored by CropLife Europe

Stage 2 testing

- The primary purpose of the proposed software testing program is to confirm a wide range of environmental fate properties (figure 1) and product use representations (figure 2) are adequately simulated in the new modelling scheme to ensure robust functionality of software as designed.
- An additional component of this testing seeks to identify where significant changes arise in computational performance and the resulting PEC endpoints simulated. This latter assessment is not a thorough regulatory impact assessment but instead simply attempts to better understand
  - i) the general impact of the changes in the framework on the aquatic exposure assessment
  - ii) the extent to which it may be possible to trace back the drivers for changes in PEC responses to one of more of the numerous adjustments in the FOCUS SW framework.

Compounds

- Testing is done for several hypothetical compounds that cover a wide range of substance properties
  - Sorption / mobility
  - Soil degradation / persistence
  - Transformation / pathway
  - SW degradation / persistence
- A number of aspects are given special consideration
  - systematic variation of input parameter
  - process adjustments that are made in the new model versions
  - handling of transformation pathways
  - adjustments made to simulations of surface water bodies

Parameter | Test compounds	TC1a	TC1b with met.	TC1c	TC2a	TC2b	TC2c with met.	TC X	TC Y
Molar mass [g/mol]	300	300	300	300	300	300	300	300
Vapor pressure [Pa at 20°C]	1.0×10-7	1.0×10-7	1.0×10-7	1.0×10-7	1.0×10-7	1.0×10-7	1.0×10-7	0.1
Water solubility [mg/L at 20°C]	1	1	1	1	1	1	1	0.1
DT_{50} soil [d]	10	10	10	100	100	100	1000	1
K_{FOC} [L/kg]	100	1000	10000	100	1000	10000	1000000	10
Freundlich 1/n [-]	1 / 0.7 **	1 / 0.7 **	1 / 0.7 **	1 / 0.7 **	1 / 0.7 **	1 / 0.7 **	1 / 0.7 **	1 / 0.7 **
DT_{50} water [d]	1000	1000	1000	10	10	10	1000	1
DT_{50} sediment [d]	10	10	10	10000	10000	10000	1000	1
TSCF / PUF [-]	0	0	0	0	0	0	0	0
Remarks	Parent / Met	ff 1 to TC2b form. from all compartments	-	-	Parent / Met	ff 1 to TC1a form. from all compartments	Extreme compound	Extreme compound
Compound properties								
Soil persistence	not persistent	not persistent	not persistent	moderately persistent	moderately persistent	moderately persistent	persistent	not persistent
Water phase persistence	not persistent	persistent	not persistent	not persistent	not persistent	not persistent	persistent	not persistent
Sediment phase persistence	not persistent	not persistent	not persistent	persistent	persistent	persistent	persistent	not persistent
Sorption	low	moderate	high	low	moderate	high	very high	very low
Rationale	rapid deg. in soil/sediment with increasing sorption			moderate deg. in soil with increasing sorption			slow/no deg./high sorption	rapid deg./low sorption
Testing GAP | Compound	**TC1a**	**TC1b**	**TC1c**	**TC2a**	**TC2b**	**TC2c**	**TC X**	**TC Y**
GAP2 (maize)	Y	Y	Y	Y	Y	Y	Y	Y
GAP 1 (potatoes)	Y	Y	Y	Y	Y	Y	Y *	-
GAP 5 (vines)	Y	Y	Y	Y	Y	Y	Y *	Y
GAP 4 (apples)	Y	Y	-	-	Y	Y	Y *	Y
GAP 6 (spring OSR)	Y	-	-	-	Y	-	Y *	-
GAP 3 (winter wheat)	Y	-	-	-	Y	-	Y *	-
GAP 7 (leafy veg.)	Y	-	-	-	Y	-	Y *	-

Figure 1: Test compounds selected for FOCUS SW Repair software Stage 2 testing
** Testing of whole GAP will be decided at later stage*
*** First tier 1/n = 1; Second tier 1/n = 0.7; decision for tier 2 will be made at later stage*

GAPs

- Tested GAPs include a range of typical uses but also special cases (e.g. leap year situations)
  - Pre-emergence, post-emergence, granular incorporation, air blast, special crops (potatoes (multi-crop) + testing of irrigation) and crops to ensure minor scenarios adequately tested
- For practicality the GAP range testing is limited to
  - All GAPs are only tested for two test compounds
  - Two GAPs are tested for all test compounds
  - Supplementary timing options and timings covering possible unusual behaviour (e.g. leap years, overlapping years)

GAP		1	2	3	4	5	6	7
Crop		Potatoes	Maize	Winter wheat	Apples	Vines	Spring OSR	Leafy vegetables
Method of application		Pre-plant	Pre-emergence	Post-emergence	orchard air-blast	Air-blast in vines	Post-emergence	Post-emergence
		granular incorp.	ground appl.	ground appl.			ground appl.	ground appl.
Application rate [g/ha]		250	250	250	250	250	250	250
No. of applications		1	1	1	3	5	1	2
Timing	**a**	**minus 1 day before planting**	**First possible app 1 day after sowing**	**From BBCH 20 ***	**First possible appl. after 15 April.**	**First possible appl. after 1 April.**	**First possible appl. after 1 March**	**From BBCH 10 * 7 d interval**
					14 d interval	**10 d interval**		
Supplementary timing options	**b**	-	7 d post emergence	From BBCH 21 * (=> generally moves appl. to spring, D6 and R4 excluded)	-	-	after 5 Mar	From BBCH 12
	c		10 d post emergence	From BBCH 30 * (=> typically 9 d later)			after 10 Mar	From BBCH 14
	d		Fixed appl. date: 15 July	Fixed appl. date: 15 July			Fixed appl. date: 15 July	Fixed appl. date: 15 July
Additional timing	**e**	-	-	Additional timing overlapping between years	-	-	-	-
	f	-	-	Additional timing leap year (29th February)	-	-	-	-

Figure 2: Intended GAP for FOCUS SW Repair software Stage 2 testing
** Timing reference to AppDate*

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