Evidence for rapid biodegradability of DCOIT

Regarding the evaluation from the CLH-report for 4,5-dichloro-2-octyl-2H-isothiazol-3-one (DCOIT) from January 2018, *"[…]DCOIT is […]regarded as not rapidly biodegradable for classification purposes".* This conclusion is based on the fact that one of the degradation products fulfils the criteria for classification as hazardous to the environment.

With this document Thor wants refute this conclusion and illustrate evidence for the consideration of rapid degradability of DCOIT.

In order to demonstrate rapid degradability according to the CLP regulation EU Nr. 1272/2008 of the active substance DCOIT, we applied the results of a simulation study in aquatic sediment systems according to OECD guideline 308. The study was performed with freshwater/sediment samples from a river and pond system at a concentration of 0.117 mg/kg for the total systems.

We created graphics *(Figures 1-2)*, which illustrate the concentrations of DCOIT and its metabolites in the temporal course measured in % of the applied radioactivity (AR). The concentrations are taken from the original study report *(cf. Tables 1-2)*. DCOIT degrades fast and the concentrations of all metabolites are always below 10% AR. Regarding the Annex 1/ 4.1.2.9 "Rapid degradability of organic substances" of the CLP regulation, there is a strong indication that the results of the study according to OECD 308 demonstrate rapid degradation.

According to the CLP-regulation Annex 1/ 4.1.2.9.2. *"[…] further classification criterion is included which allows the use of data to show that the substance did actually degrade biotically or abiotically in the aquatic environment by > 70 % in 28 days. Thus, if degradation is demonstrated under environmentally realistic conditions, then the criterion of 'rapid degradability' is met."* Annex 1/ 4.1.2.9.3. further enables the usage of primary degradation of the active substance in order to demonstrate rapid degradability. Hereby the classification of degradation products should to be taken into consideration.

From this we conclude that the criteria for rapid degradability are fulfilled if not more than 30% AR is left in the system after 28 days, which holds true for the relevant radioactivity associated with parent substance and its metabolites in our study according to OECD guideline 308.

In our opinion it cannot be scientifically justified to consider exclusively the classification of the metabolites and ignore their concentrations in the temporal course. For an evaluation of the metabolites in the context of rapid degradability the same rules have to be applied as for the parent substance. Indeed, the concentrations of the metabolites are always below 10% AR and even the summation of the radioactivity associated with the metabolites leads to a percentage of less than 20% AR at day 28. Therefore the criteria for rapid degradability are fulfilled if the same rules are applied to the metabolites.

Further, we conducted a worst-case approach which excludes primary degradation. In this approach the radioactivity associated with the metabolites is attributed to the parent substance. Under these circumstances the sum of remaining radioactivity after 28 days accounts <20% and no classified metabolites arise. Therefore even in this worst-case scenario the criteria for rapid degradability are fulfilled.

Thus, we conclude that the active substance DCOIT should be considered to be rapidly degradable.

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day	0	1	2	3	7	15	28	61	100
DCOIT	86,9	43,3	34,5	13,0	2,2	1,3	1,3	0	0
M1	0,1	1,2	1,9	1,9	2,7	3,2	3,8	1,3	0
M2	0,5	3,5	4,6	1,9	1,3	0,3	0,7	0,2	0
M4	0,2	4,9	5,6	4,1	1,1	0,9	0,1	0,1	0
M11	0,8	1,3	1,0	2,8	3,0	3,7	2,8	0,3	1,1
M12	0	1,4	0,8	2,7	3,8	4,2	3,1	0,1	3,5
M13	0	2,3	1,0	3,6	4,0	3,6	3,0	1,0	0
Sum	88,5	57,9	49,4	30,0	18,1	17,2	14,8	3,0	4,6

Table 1: *Concentrations of DCOIT and its metabolites in the pond system*

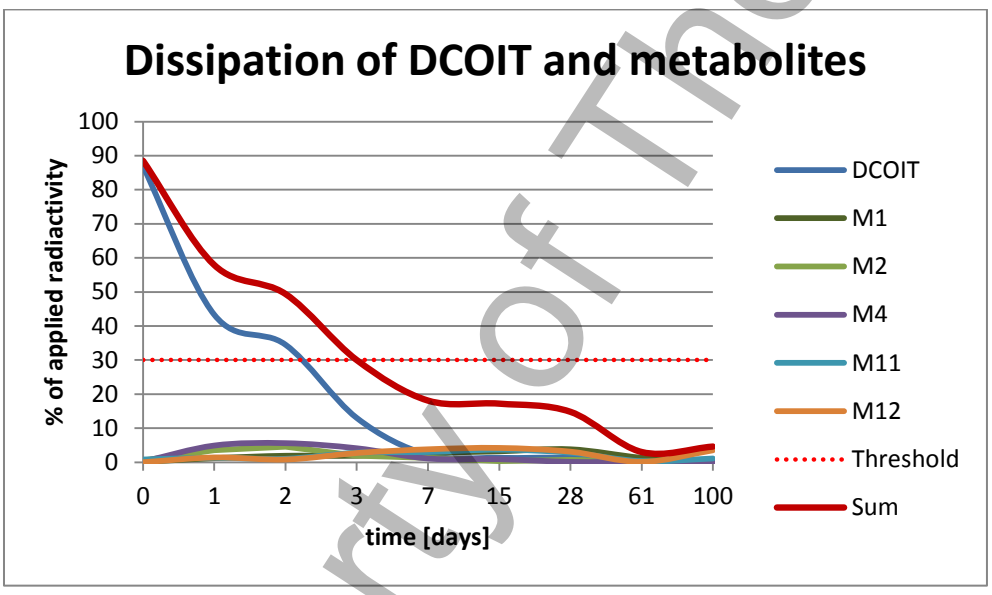

Figure 1: *Concentrations of DCOIT and its metabolites in the pond system*

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day	0	1	2	3	7	15	28	61	100
DCOIT	87,9	65,3	32,4	20,8	4,5	1,6	2,8	0	0
M1	0,2	0,7	1,3	2,4	3,0	3,3	3,9	2	2,1
M2	1,6	3,8	3,9	3,2	2,3	0	0,6	0	0
M4	1,2	2,7	3,9	3,6	2,1	0,5	0	0	0
M6	0,5	3,1	3,7	8,5	1,7	0,5	0,6	0,4	0
M11	0,5	0,9	2,8	2,3	5,3	5,3	3,0	1,2	0,9
M12	0,4	0,7	1,2	2,2	5,1	4,7	3,2	1,5	3,4
M13	0,5	1,4	4,9	5,4	8,0	6,7	4,3	2,7	1,0
Sum	92,8	78,6	54,1	48,4	32,0	22,6	18,4	7,8	7,4

Table 2: *Concentrations of DCOIT and its metabolites in the river system*

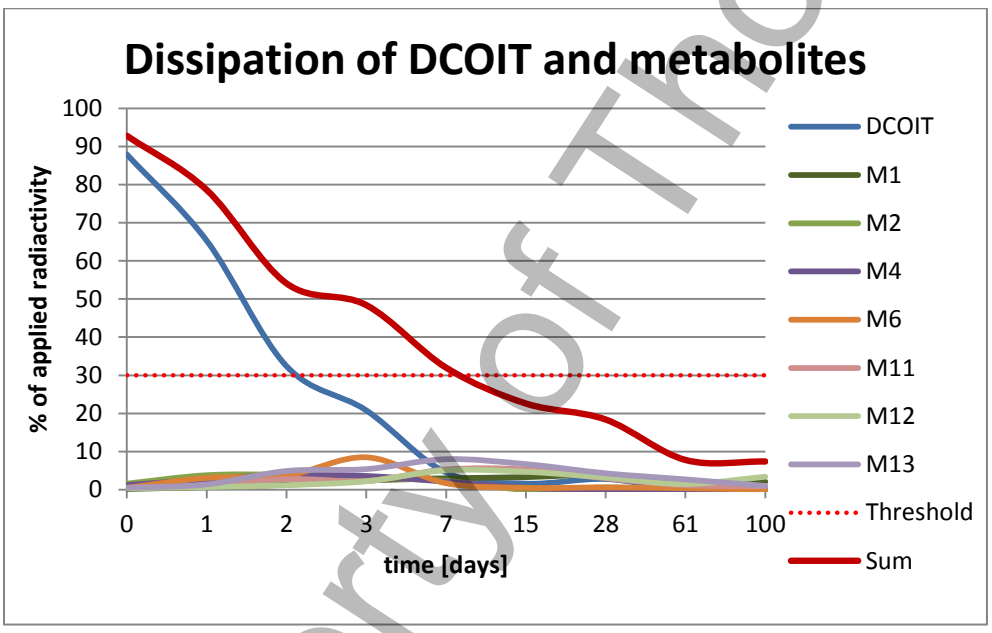

Figure 2: *Concentrations of DCOIT and its metabolites in the river system*

Literature

1) **4,5-Dichloro-2-Octyl-[Ring-4,5-^{14}C]Isothiazol-3[2H]-One (^{14}C-DCOIT): Route and Rate of Degradation in Aerobic Aquatic Sediment Systems**
2) **Regulation (EU) No. 1272/2008 (CLP)**

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