Outdoor Use of Biocidal Products – considering contaminated rainwater pathways in the urban context and potential for harmonisation

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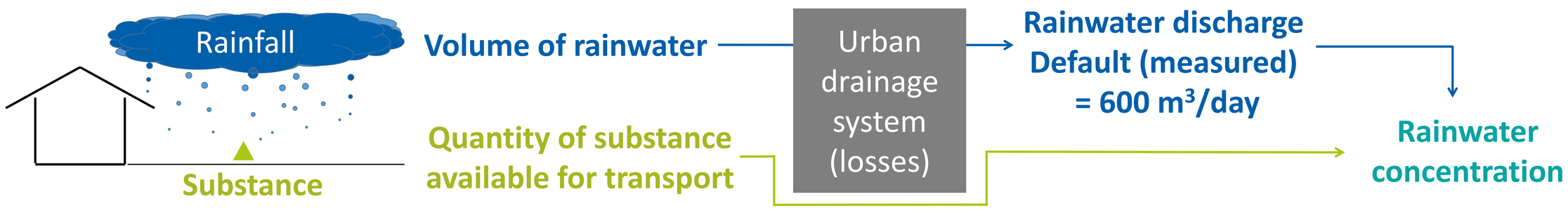
1st tier approach (Biocides PT 6.2/6.3 and 7-10)

Recommendations on a first tier risk assessment for emissions in rainwater have been published on the ECHA website: "The assessment of direct emission to surface water in urban areas (PT 6.2/6.3 and 7-10)" (UBA, 2014). This approach proposes to compare the **calculated amount of product released** within the typical ESD catchment with a **default daily rainwater discharge rate**, which is based on measured data. It is recognised that dilution may be underestimated:

> *"Bearing in mind that (a) rainwater collected in rainwater sewers and directly discharged to surface water is presumably not totally recorded in the data of Table 1 and (b) possible infiltration water in the rainwater sewer is neglected, which both would increase the amount of rainwater, a rainwater discharge rate of 600 m^3 per day seems to be a realistic worst case assumption for rainwater sewers"*

It is acknowledged that rainwater losses occur in the system (via infiltration and retention, in particular), which is incorporated within the default value of 600 m^3/day, but corresponding losses of the solubilised substance are not taken into account. Moreover, additional phenomena of adsorption and degradation within the system are ignored.



Calculated rainwater discharge values

Alternative rainwater volumes were calculated using the ESD defaults for house surface (AreaHouse) and catchment size (NbHouse), combined with HardSPEC assumptions on hardsurface coverage (Fcatchment) and run-off (Frun off), as well as general assumptions on expected connectivity for a residential area (Fconnectivity).

Input parameters

- $Area_{House}$ = House surface area from the ESD (OECD, 2008)
- Nb_{House} = Default catchment of 4000 houses (UBA, 2014)
- Observed surface coverage and run-off for a British residential area (FERA, 2012) as well as proposed connectivity estimates:

Surface type	Fcatchment	Frun off	Fconnectivity
Concrete	0.1477	0.65	0.75
Bricks	0.0391	0.50	0.75
Roof	0.213	0.68	1
Asphalt road	0.11	0.75	0.95*
Asphalt (other)	0.0476		0.75

* Proposed by (FERA, 2012), other connectivity values were estimated

Estimated rainwater volumes generated in the catchment:

$$Area_{catchment} = Nb_{House} \times Area_{House} \times \frac{1}{Fcatchment_{Roof}}$$

$$V_{rainwater} = Precipitation \times Area_{catchment} \times \sum_{Surfacetype} Fcatchment_{Surfacetype} \times Frun\ off_{Surfacetype} \times Fconnectivity_{Surfacetype}$$

10 mm rainfall event (1hr storm event) → **8300 m^3**

4 mm rainfall event (1hr typical rainfall event) → **3320 m^3**

Some level of variance between measured and calculated rainwater quantities can be expected, in the light of the use of assumptions and expected catchment to catchment variations. Results appear to suggest that losses within the system and what constitutes a realistic urban scenario may not be well understood. However, the observed magnitude indicates that calculated losses using HardSPEC defaults and assumed connectivity levels are conservative. It is proposed that HardSPEC would also help to provide conservative estimates of loss of the substance.

Proposed factors to be considered, at 2nd Tier

The HardSPEC model is commonly used for herbicides applied in urban areas by the UK pesticide regulatory authorities (CRD); it is proposed that the approach used in HardSPEC could be the basis for designing a second tier approach for biocides.

	Factor causing reduction at the drain for…	
	Rainwater	Substance
Run-off	X	X
Infiltration and connectivity to the drains	X	X
Retention	X	X
Evaporation	X	
Adsorption and release		X
Degradation		X

- Water run-off varies depending on porosity, retention, slope of the surface and losses via cracks/joints (contributing to infiltration). According to a selection of European studies on run-off from hard surfaces, observed run-off ranges from 9% to 93% (FERA, 2012).
- Not all run-off water would reach the drains: for patios and paths, water would drain to the edge (soft surface) or to a soakaway whenever possible.
- Release of actives is dependent upon substance's susceptibility for adsorption and solubility. Some strongly sorbed compounds, applied at some distance to the drains, may be subject to permanent retention within a catchment, with loss to rainwater only occurring via particulate wash-off.
- Potential for degradation between treatment and rain event

References: OECD (2008) Emission Scenario Document for Insecticides, acaricides and products to control other arthropods for household and professional use. OECD Environment, Health and Safety Publications, Series on Emission Scenario Documents No. 18. OECD, Paris 17 July 2008. ENV/JM/MONO(2008)14
FERA (2012) Development of a home and garden scenario for HardSPEC; Defra project PS2237 & PS2236; Authors: J. Hollis, C. Ramwell, H. Parry; June 2012.
UBA (2014) The assessment of direct emission to surface water in urban areas (PT 6.2/6.3 and 7-10)