



Development of a Harmonised Study Design for the Measurement of a Foliar Wash-off Coefficient for use as a Modelling Parameter

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1. Introduction

The foliar wash-off coefficient is a parameter in FOCUS surface water and Soil PEC modelling which can refine the soil loading after a sprayed application of pesticides. EFSA accepts that the modelling default can be superseded by experimental data with plants under a range of relevant conditions. Previous attempts to generate such data have suffered from the lack of a harmonised protocol for the study conduct. Specifically, the selection of crop types and growth stages was not deemed suitable to cover the submitted GAP. Furthermore, the analytical methods were not always validated appropriately.

An ECPA workshop in 2015 proposed that the most suitable first step in development of a harmonised protocol would be to agree the design of a "single test" (i.e. a single crop/growth stage/AI/formulation) and conduct a ring test on this design. The purpose of the ring test would be to establish the robustness of the design in several laboratories and, importantly, to understand the impact of the specific rainfall delivery system used; i.e., whether a highly sophisticated system is necessary or whether a simpler system could be adequate.

Foliar Wash-off Coefficient

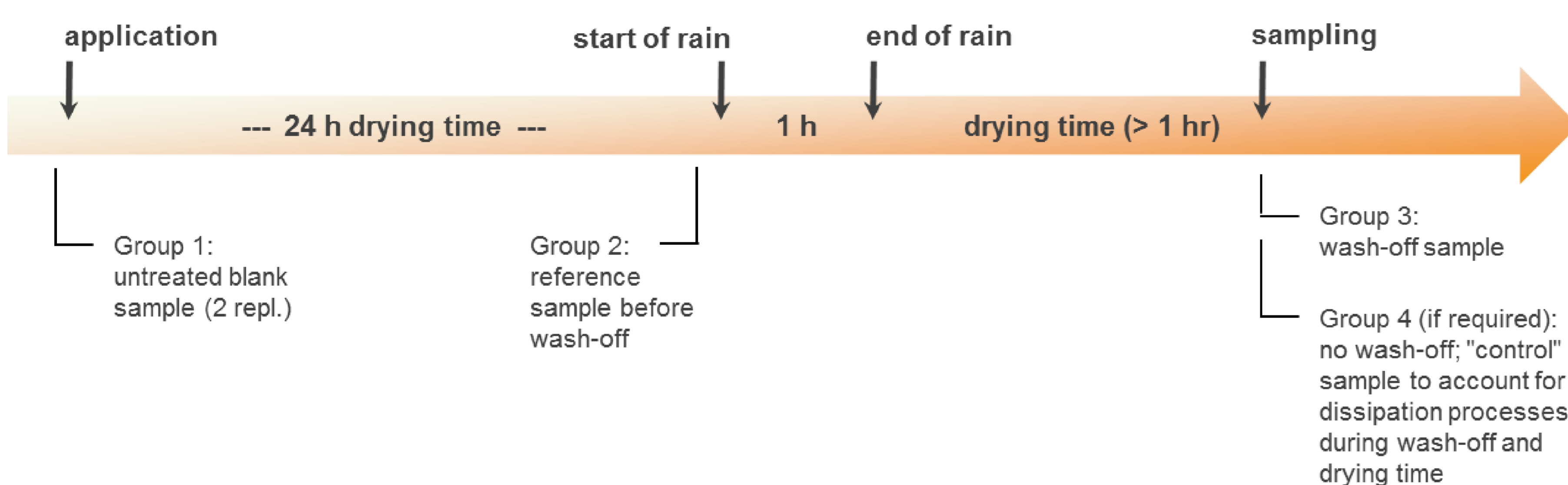
Figure 1 : Equation for evaluation of ring test data generated for one specified rainfall event

$$w = \frac{c_0 \left[\frac{\mu g}{kg} \right] - c_x \left[\frac{\mu g}{kg} \right]}{c_0 \left[\frac{\mu g}{kg} \right]} \cdot q \text{ [cm]}$$

- C_0 Initial active ingredient concentration in plant material after drying period of 24 h and before rainfall
- C_x Residual active ingredient concentration in plant material after rainfall
- q Rainfall depth (cm)

2. Proposals for Test Protocol (from 2015 Workshop)

Proposal	Rationale
Whole plants should be used rather than single leaves	Retains a realistic "3D-architecture"
Plants should be sprayed rather than pipette-applied	More realistic droplet characteristics
Rainfall to be characterised in terms of droplet size spectrum and intensity	Allows comparison with natural rainfall
Rain should be applied 24 hours after application as a default	Sensible timing with respect to likely timing between application and forecast rain events. Also a convenient time if label restrictions are required as a result
Plants should be extracted using the Crop Residue Method	Method is fully validated to GLP, therefore extraction efficiency can be assured



Study Concept

- 4 groups of plants are grown to the stipulated BBCH stage
- 1 group is untreated (controls for matrix-matched standards)
- Spray 3 groups of 8 replicate plants (Groups 2 - 4) according to the GAP
- Allow to dry for 24 hours
- Remove Plant Group 2 for residue analysis (represents the pre-rainfall control group)
- Apply rainfall at 20 mm/hour for 1 hour
- Allow to dry for at least 1 hour
- Remove Plant Group 3 for residue analysis (post rainfall samples)
- If applicable, Plant Group 4 (not subjected to rainfall) is analysed at the same time to determine whether other dissipation processes are significant

3. Ring-Test Proposal

- Tebuconazole selected for the test (**Folicur EW 250**)
 - Supplied centrally by Bayer AG
- Validated crop residue monitoring method supplied by Bayer AG
- Tomato selected as the first crop for testing
 - Seeds supplied centrally by Syngenta
- BBCH 25 (aligned with Tebuconazole GAP)
- No restriction placed on rainfall delivery system
 - Will range from sophisticated rain-towers to simpler "track sprayer" systems
 - Will provide a first assessment of whether rain-towers are an absolute requirement for generation of a valid wash-off coefficient
- Rainfall droplet size distribution and intensity to be measured (preferably using a Laser Precipitation Monitor (LPM))



Participants :



4. Next Steps

- If variability between the results is small, the next steps would be to design a research program to investigate different crops, with the aim of validating clustering of crops in a small number of groups based on leaf morphology. This will help to clarify what size of study package would be required to support each product.
- If variation is large, further testing may be required to distinguish analytical variability from methodological variability (e.g. differences in rainfall delivery system)