CropLife Europe Comments on JRC Technical Report: Pesticide Residues in European Agricultural Soil – 2023 Report

1. Ecotoxicity Data Set Used in the Evaluation

Experts from the JRC and EFSA identified four datasets based on their scientific and policy relevance:

- EFSA OpenFoodTox (EFSA, 2022)
- US EPA Ecotox database (EPA, 2023)
- The University of Hertfordshire Pesticides Properties Database (PPDB) (AERU, 2022)
- OECD eChemPortal (OECD, 2022)

However, the EPA portal utilizes literature data and so studies will not necessarily have been conducted to standardized ecotoxicity testing guidelines nor be GLP compliant. The reliability of these endpoints is therefore questionable. The JRC report notes that the minimum reported chronic no-effect concentrations (NOECmin) for each active was selected for the assessment of toxic pressure on soil organisms. This includes endpoints for several different species of earthworm e.g., Allolobophora icterica, Lumbricus rubellus, Aporrectodea caligniosa, collembolans, soil mites and enchytraeids. Defined testing methods are not available for many of these species and normal operating ranges of this variety of species will be unknown. As such interpretation of the results to assess a toxicity may not account for the natural variability in sub-lethal effects within the species, making it difficult to draw definitive conclusions for treatment related effects.

The principle of NOEC assessment may also not represent an actual toxic effect, but instead simply represent the concentrations tested in the study i.e., a NOEC can be defined as the only concentration tested or the highest concentration tested.

Chronic NOEC endpoints were reported for only 78 of the 118 substances included in the assessment. The data gaps for the other 40 substances were derived with QSAR predicted data or with extrapolations from short term (14 days) earthworm LC50 data assuming a correction factor of 10; the rationale for the latter is not explained. Reliability of the toxicity endpoints is therefore questionable.

2. RQ Calculations

The overall toxic pressure of pesticide residues for a given biological endpoint is the result of the combined toxic contribution of each component of the mixture. The concentration addition or sum of risk quotients (RQs) is a commonly used model used in screening mixture risk assessment. This is simply calculated by adding the risk quotients obtained for each substance.

The assessment for each active is an RQ calculation based on measured concentration and lowest reported NOECmin from soil organism studies.

i.e., RQ of < is low risk, RQ > 1 high risk (i.e., soil concentration exceeds NOECmin).

For each site a combined assessment, based on the sum of RQ values of the actives measured at the site, is calculated to describe the toxic pressure from the substances. A combined RQ value will therefore be skewed by those actives which trigger a high RQ score individually, and so does not necessarily represent the combined risk.

As the individual RQ values are calculated from the NOECmin which is derived from any of the soil organism species assessed, combining the endpoints in the cumulative RQ calculation provides an unrepresentative worst-case. As different species will have different sensitivities to each substance, combining the RQ values for each site assumes a cumulative risk from each of the substances which will not necessarily be the case. For example, a high risk from one substance to earthworms does not equate to a 'higher risk' when combined with another active which triggers a risk for collembola.

3. Substance Bias

Currently more than 450 active substances are approved and available for application by 2018 (Eurostat, 2021) in the EU. However, in this study case, only 118 pesticides residues were assessed, with a greater focus given to substances presenting longer half-life, and not particularly for short-time and high-toxic impacts due to the unlikeliness of determining a representative extent of such substances.

The report focused on active substances which were more likely to be present in soil due to their persistence. The report notes that 118 of potential 450 actives were assessed based on those registered in EU in 2018. The report acknowledges the risk is predominantly driven by 3 to 5 active substances: chlorpyrifos, epoxiconazole, imidacloprid, dimoxystrobin and difenoconazole. These actives are legacy substances which are now either no longer approved for use in the EU, under restricted use to specific geographies or available for emergency application only.

In total 1.7 % sites have a calculated RQ > 1 (high risk) and in approximately 50 % of these sites the high RQ score is attributed to just one substance.

Including an additional assessment which excludes these 5 key substances would make a notable difference to the number of sites identified as high risk and allow for a broader assessment of relevant EU substances to identify those which may be triggering further assessment in the future.

4. Comparison of Residue Data from 2015 and 2018

The report highlights a comparison of measured residues in 2015 and 2018 and describes an increase by 30 % for high-risk sites (RQ >1) in 2018. This was interpreted as an increase in pesticide use in 2018. However, only 73 of 3473 sites were used in the comparison, as only these sites are similar between both years. Unfortunately, a further description of these 73 sites is lacking. Environmental conditions at the time of application, pest pressure differences or crop selection in both years could have a notable effect on soil exposure and persistence. The report notes that 30 days before sampling environmental conditions were reported based on the nearest available weather station to sample site. However, it was not possible to assess conditions at application or include assessment of application timing compared to sampling timing. Without this information it is not a constructive comparison of the two years due to a range of environmental variables effecting exposure and sampling timing verses application timing which will affect measured concentrations.