

Code Number and Title:

LRI-ECO25: Development of Soup Tests for the Risk assessment of NER in Soil

Background

This RfP is based on the recommendations from two [ECETOC](#) Task Forces¹⁻² that have just completed a two year review of scientific issues associated with extraction of bio-available and bio-accessible residues and subsequent risk assessment of Non-Extractable Residues (NER). Whilst the Task Forces identified the need for further work to address NER in both sediments and soil, the methodologies are more straightforward in soil. Although this RfP focuses on NER in soil, the principles of the risk assessment of NER may be applied to sediments.

ECETOC Technical Report 117 identified that basic fate and binding data for chemicals in the terrestrial environment are missing¹. Further experimental testing is required to validate the extraction regime proposed in TR 117 and improve scientific understanding of the relationship between extraction technique and bio-availability. Further experimental testing is also required to validate soil based 'soup' tests (proposed in TR 118²) and thereby confirm that NER are non-toxic to soil organisms and therefore indicate how they should be considered in the risk assessment of chemicals.

Objectives and scope

Test chemicals with known toxicity to terrestrial organisms and likely to form significant NER will be selected. Each test chemical (it is expected that ¹⁴C or ³H labeling will be required, and the project budget should include these costs) will be dosed into a standard (natural) soil accordingly to OECD guidelines and allowed to stand for known periods of time and then extracted using the scheme developed in TR117 to identify the bio-available, bio-accessible and NER fractions. The fraction of parent and transformation products will be determined and NER quantified by combustion of the soil. This approach aims to validate the extraction scheme developed in TR 117 and discriminate between non-destructive and destructive solvent extraction methods.

Information gathered from these initial radio-labelled studies would help develop a subsequent soil based 'soup' test to check the ecotoxicity of the NER fraction identified from the initial studies. The standard (natural) soil will be dosed with the same test chemicals to replicate the previous radio-labelled studies which provided the highest level of NER. Control and dosed soils will be extracted using the optimum solvent conditions for removing the bio-accessible fraction and any remaining solvent carefully removed. The solvent-extracted soils will then be admixed with fresh (viable) soil and

tested, along with unextracted control and dosed soil in a series of terrestrial toxicity studies involving soil microorganisms (OECD 216), earthworms (OECD 222) and plants (OECD 208).

Data from the 'soup' tests will permit a comparison between extracted dosed soils (NER fraction alone) and unextracted dosed soils (bioaccessible/bioavailable + NER fraction), as well as between extracted dosed soils (NER fraction) and extracted undosed soils (controls). Uptake of NER into earthworms and plants could also be assessed by using soils previously dosed with radio-labeled test chemicals from the earlier solvent extraction validation study.

In order to fully test the NER for its potential ecotoxicity, an evaluation of extracted residues will also be performed. Currently there are no standard methods, except for isolation and testing of each transformation product. An approach that tests the whole extract and applies an effect-driven philosophy³ will be developed. In addition, a suitable microbial bioassay will be identified that quantitatively correlates the bio-accessible fraction with the solvent extraction method.

Further guidance in the use of NER data in risk assessment will also be developed. For example, the selection of appropriate test species and how many trophic levels has not yet been defined. Also, relating the exposure concentration to the observed effects in extracts (with uncharacterised transformation products) would need to be considered.

Deliverables

The final report shall contain an executive summary (2 pages max), a main part (max. 50 pages) and a detailed bibliography. It is expected that the findings will be developed into at least one peer reviewed publication, following poster(s) and/or platform(s) at suitable scientific conference(s).

Cost and Timing

Start in early 2014, duration 3 years

Budget in the order of €400.000

Partnering/Co-funding

Applicants should provide an indication of additional partners and funding opportunities that can be appropriately leveraged as part of their proposal. Partners can include, but are not limited to industry, government/regulatory organizations, research institutes, etc. Statements from potential partners should be included in the proposal package.

***Fit with LRI objectives/ Possible regulatory and policy impact involvements/
Dissemination***

Applicants should provide information on the fit of their proposal with LRI objectives and an indication on how and where they could play a role in the regulatory and policy areas. Dissemination plans should also be laid down.

References

1. ECETOC (2012) "Understanding the relationship between extraction technique and bioavailability" ECETOC Technical Report 117, Brussels
2. ECETOC (2012) "Development of interim guidance for the inclusion of non-extractable residues (NER) in the risk assessment of chemicals" ECETOC Technical Report 118, Brussels
3. Escher BI, Fenner K (2011). Recent advances in environmental risk assessment of transformation products. *Environ Sci Technol* 45(9):3835-3847

DEADLINE FOR SUBMISSIONS: 1 September 2013

Please see www.cefic-lri.org for general LRI objectives information, project proposal form and further guidance for grant applications. For further assistance do not hesitate to contact lri@cefic.be.