

WORK PROGRAM
FOR THE
EU REFERENCE LABORATORY
FOR PESTICIDE RESIDUES REQUIRING
SINGLE RESIDUE METHODS

Time: January-December 2011

LEGAL FUNCTIONS AND DUTIES

The functions and duties of the EU Reference Laboratory are described in Article 32 of the EC Regulation No 882/2004.

Contents:

- A. General tasks**
- B. Development and validation of analytical methods**
- C. Quality assurance and quality control including the organisation and implementation of proficiency tests**
- D. Technical and scientific support to NRLs/ EU official labs and third country labs**

A. General Tasks

A.1 EURL meetings for coordination, planning and evaluation of activities

Tasks: Missions will be carried out by EURL-SRM members to participate in inter-EURL-meetings; aiming at planning, coordinating, evaluating, updating or conducting EURL-activities such as work programs, proficiency tests (PTs), method validations, joint web-platforms. Date and place of these meetings will be decided later. Meetings in presence of the EURL and EUPT-advisory group will be organized by the EURL-FV.

Period: *To be decided later following consultations with the other EURLs and the Commission.*

A.2 Technical and scientific support to the Commission

Tasks: The EURL-SRM will continue supporting the Commission's efforts in drafting a risk-based and meaningful plan for the EU-coordinated control program (CCP). The EURL-SRM will furthermore continue providing scientific assessments, opinions and advices to the Commission as requested. These activities will include the involvement in the EFSA residue evaluation process, on behalf of the Commission, by giving opinions and advices as regards residue definitions and routine validated methods with focus on their practical applicability in labs conducting official pesticide residue analyses. Jointly with the other EURLs the EURL-SRM will, furthermore, assist the Commission in the revision of Document No. SANCO/10684/2009. Missions to meetings in Brussels, Parma or elsewhere will be carried out as necessary and as requested by the Commission.

Period: *As requested by the Commission.*

A.3 Compilation of annual financial and technical reports

Tasks: see title

Period: *March 2011*

Deliverables: Reports in March 2011

A.4 Preparation of work program and provisional budget for following year

Tasks: see title

Period: *August 2011*

Deliverables: Work Program in August 2011

A.5 Co-operation with international organizations as agreed with the Commission

Tasks: Cooperation with int. organizations such as the Codex Alimentarius (Committee on Pesticide Residues), CEN, FAO/IAEA will continue. As far as requested by the commission, missions to attend meetings will be conducted.

A.6 EURL-Web-Service (Horizontal Task)

Tasks, period: see sub-topics below

A.6.1 EURL-Web-Portal, upgrading and maintenance

Background: The Internet Portal of the four pesticide EURLs (www.eurl-pesticides.eu) has been in operation since 2007. It aims to facilitate dissemination of information from EURLs to NRLs and official laboratories in an efficient, timely and transparent way. Several improvements and extensions have been introduced so far.

Task: In 2011 the portal and the individual web-sites of the EURLs will be further expanded and gradually filled with valuable information. Still missing features will be gradually programmed according to the needs of the EURLs and the Network. A survey among the members of the Network will be conducted to get a feedback on the website that will help planning of further upgrading steps. The strategy to be followed will be discussed with the other EURLs and in close consultation with the COM.

Period: Throughout 2011

Deliverables: updated version of website

A.6.2 EURL Data-Pool

Background: An “EURL Data-Pool” entailing numerous databases with information of practical interest to the network-laboratories has been installed and expanded within the frame of the previous work programs (www.crl-pesticides-datapool.eu). This data-pool is gradually being expanded as regards the number and extent of its databases as well as the volume of data stored.

Table 1: The table below gives an overview of the databases (status July 2010):

Database/Tool	Drafting of a plan	Programming of base structure	Structural improvements	Database available on-line	Collection of data
A.6.2.1 Method Validation DB	Done	Done	Ongoing	available	Ongoing
A.6.2.2 Methods DB	Done	Done	Ongoing	H2/2010*	Ongoing
A.6.2.3 Pesticides DB	Done	Done	Ongoing	available	Ongoing
A.6.6.3.1 Stability of Standards DB	In progress	Ongoing	2011-	H2/2012	Ongoing
A. 6.6.3.2 Check your Scope Tool	Done	Done	Ongoing	H2/2010*	Ongoing
A. 6.6.3.3 Pesticide Authorizations DB	Done	Ongoing	2011-	H2/2010*	Ongoing
A.6.2.4 Commodities DB	Done	Done	Ongoing	available	Ongoing
A.6.2.5 Lab-Network DB	Done	Done	Ongoing	Aug 2010	Ongoing
A.6.2.6 EUPT-Archive DB	Done	Done	Ongoing	H2/2010*	Ongoing
Other related activities					
D.5 EURL-Survey Tool	Done	Done	Ongoing	Done	Ongoing

* test versions (i.e.: not publicly available)

Tasks: see sub-topics below

Period: see sub-topics below and Table 1

Deliverables: updated version of websites (as shown in Table 1)

A.6.2.1 Method Validation DB

Background: With method validation being compulsory for accreditation purposes, numerous validation experiments are being performed by various laboratories to evaluate analytical procedures to check if they can meet the specified criteria. The “**EURL-Method Validation Database**” has been developed to allow a systematic collection of this great amount of data produced in intra- and inter-laboratory validation experiments. Online search tools allowing customized filtering and sorting of the data give laboratories the possibility to better assess the suitability of analytical methods for the analysis of various pesticide-commodity combinations. The potential of this website has been already recognized by Codex that has prompted the member countries to contribute their results to the database.

Task: In 2011 structural improvement and collection of data

Period: see Table 1

A.6.2.2 Methods DB

Background: With the creation of the method validation database (6.2.1) the laboratories were provided with the ability to store the results of their method validation experiments in a common pool. Important for the labs is furthermore the availability of data concerning the methodology of single and multiresidue procedures. Such data will be stored in the “**Methods Database**” providing reference to the source of information as well as links to online documents (e.g. the list of methods collected by the FAO/IAEA). Inter-linkage with the method validation database is foreseen where applicable.

Task: In 2011 structural improvement and collection of data

Period: see Table 1

A.6.2.3 Pesticide DB

Background: Pesticide residue analysts have to deal with a vast number of different pesticides and metabolites. With each pesticide behaving differently it is difficult for the analysts to maintain an overview of the situation. A differentiated and detailed knowledge of the properties of the different pesticides is necessary for understanding and predicting their behavior during analysis and thus essential when it comes to making the right decisions in method development, method validation and everyday analysis situations. Several sources of information about the properties of pesticides already exist in literature as well as the internet, however their practical usefulness for the analysts is limited. A main problem is that existing information is dispersed among countless sources. This not only makes it extremely difficult to retrieve, but it also does not support the formation of a global overview, which is essential for strategic planning.

The “**Pesticides Database**” aims at providing pesticide residue analysts with valuable pesticide-analysis related information within a single platform in order to help them save time and assist them in the design of more efficient analytical strategies.

In addition to the information collected from various sources the database is intended to also contain useful experimental information generated by applying appropriate tests to systematically study the behavior of pesticides during the various critical stages of analysis such as sample comminution, extraction/partitioning, cleanup, storage of extracts and standards, chromatography and detection.

The laboratory tests should be such to enable the identification of potential sources responsible for losses of the individual pesticides such as unfavorable partitioning and adsorption phenomena, as well as the exposure to certain conditions (e.g. extreme pH-values, temperature, light, air, enzymes etc). Information necessary for the chromatographic analysis and detection of pesticides such as mass spectra, chromatographic behavior information, and detection sensitivities achieved with various commonly used instruments will also be generated and collected. Pesticide recovery tests using common multiresidue procedures are also part of this scheme, with this data being collected from various laboratories and stored in the method validation database.

The data collected should ultimately allow to classify pesticides into categories (profiling) and to select representative pesticides based on scientifically sound evaluations. The selection of representative pesticides is important when it comes to simplifying validation procedures. The data generated should furthermore help to classify the pesticides in multi- and single-residue compounds and to pinpoint the potentially critical points in the analysis, thus facilitating targeted method development.

Task: In 2011 the focus will be in further upgrading the existing “Pesticide Properties Database” and in the collection of further relevant data both from various sources as well as from experiments performed by the EURL-SRM. The priority should lay on new pesticides as well as on pesticides with high analytical relevance (e.g. because of frequent usage in agriculture, high toxicity or inclusion in coordinated community control programs).

Period: see Table 1

A.6.2.3.1 Pesticide Stability DB

A significant source of errors in pesticide residue analysis is the degradation of standards in stock solutions, working solutions (e.g. in pesticide mixtures), as well as in sample extracts. Quality Control protocols always require from laboratories to take the necessary measures in order to ensure that this source of errors remains insignificant. Numerous tests have to be performed every year to ensure that the standards employed in analysis are within the acceptable concentration range as required by the AQC-protocol. However, due to the high costs and lots of labor involved here, many laboratories are unable to conduct these controls at the degree required. A common database, where information about the stability of pesticides can be stored, is thus of high value and will help to exploit the existing synergy potentials in this area.

Task: In 2011 structural improvement and collection of data.

Period: see Table 1

A.6.2.3.2 “Check Your Scope” - Tool to help labs to optimize their target pesticide scope

Background: Regulation 396/2005 states that Member States shall establish multi-annual national control programmes for pesticide residues based on risk and they shall update them every year. Risk-based analytical strategies are not only requested by regulation but are also indicated by common sense as they contribute to a more efficient control. Within the aim of adjusting the scope of the coordinated control plan for pesticides, the EURL-SRM has developed a ranking list based on a points system, which takes various aspects contributing to the relevance of a pesticide into account. These factors include toxicology, residue findings in food samples as well as the potential for pesticide use and misuse in agriculture.

An online “Check your Scope” tool has been programmed in its base structure. The idea is that laboratories can indicate their current scope of pesticides and metabolites and receive a list highlighting the compounds of high relevance that are not covered. By comparing their analytical scope with this ranking list laboratories should be able to expand and adjust it in a target-oriented and meaningful fashion. Data concerning the amenability of the pesticides and metabolites to certain analytical techniques, as stored in the pesticides-DB, can be displayed to further improve the quality of information given to the laboratories and to support their decisions and reasoning when it comes to purchasing new equipment. In a survey conducted by the EURL-SRM 91% of participants belonging to official laboratories rated the idea of establishing the CheckYourScope service as useful or very useful.

Task: In 2011 structural improvement and collection of data

Period: see Table 1

A.6.2.3.3 Pesticide Authorizations Database

Background: Targeted risk-based approaches are essential for an efficient pesticide residue control. Within the aim of improving the scope of the coordinated control plan for pesticides the EURL-SRM has developed a ranking list based on a points system which takes various aspects indicating the relevance of pesticides into account, such as toxicology, residue findings in food samples as well as the pesticide use and misuse potential in agriculture.

As data on the real usage of individual pesticides in the various cultures are very difficult to obtain, information concerning the registration/authorization of pesticides for use in specific cultures in certain countries can serve as an alternative. Of interest are not only authorization data from EU-MS but also data from other countries exporting goods to EU countries.

The collected data can serve various purposes e.g.: 1) for the calculations of the pesticide-ranking list of the EURLs (pesticide authorizations is one of the factors considered); 2) to identify pesticide misuse cases (by comparing the residue findings with the data in the authorization DB); 3) to localize pesticides with misuse potential in the EU (mainly pesticides that are not authorized in the EU but used in other countries with similar climatic conditions and cultures); 4) to localize pesticide/commodity combinations of high risk (e.g. pesticides of high toxicity that are authorized in third countries to treat certain crops which are imported in the EU).

Task: In 2011 the database will be improved in collaboration with the EURL-FV. Contacts with relevant institutions within and outside the EU will be further consulted to retrieve appropriate and reliable data sources with the aim to simplify database updating.

Period: see Table 1

A.6.2.4 Commodity DB

Background: Pesticide residue analysts have to deal with a vast number of different commodities. With each commodity having a different influence on analysis it is difficult for the analysts to maintain an overview of the situation. A differentiated and detailed knowledge of the properties of the different commodities is paramount for the understanding of their behavior during analysis and can help the analyst to make the right decisions in method development, method validation and routine analysis. Several sources of information about the properties and the composition of commodities already exist in literature as well as the internet, however, their practical use for pesticide residue analysts is limited. A main problem is that the information provided is dispersed among countless sources. This not only makes the information extremely difficult to systematically retrieve, it does also not support the formation of a global overview, which is very valuable for strategic decision-making.

In 2008 a **Commodity Database** was constructed in its base structure and in 2009 it was further improved and fed with data. The DB allows the systematic collection of commodity-related information that is useful for pesticide residue analysts. In addition to the information collected from various sources the intention is that the database should also contain useful, experimentally generated information to elucidate the behavior of the various commodities and their components during the various stages of pesticide residue analysis and their influence on analysis. These experiments may entail the measurement of the matrix load in the extracts before and after cleanup, the influence of matrix on pesticide degradation, the responsiveness of matrix components to various common cleanup approaches, and the study of interferences in measurement including matrix effects.

The data collected should ultimately allow to predict the potential influence of commodities on the analysis of pesticides and furthermore give the possibility to classify the commodities into categories (profiling), thus allowing the selection of representative commodities based on a scientifically sound evaluations. The selection of representative commodities is important when it comes to rationalize validation procedures. Having all (the collected and generated) information in a single platform will help residue analysts to obtain a more global overview of the various commodity types and help them in solving analytical problems.

In combination with the Pesticide DB, this database will form a highly valuable tool for pesticide residue analysts providing them with a convenient and efficient access to information needed for proper decision-making.

Task: In 2011 structural improvement and collection of data

Period: see Table 1

A.6.2.5 Lab-Network-DB

Background: A “**Lab-Network-Database**” with information about all laboratories within the EURL-NRL-Official Lab Network was constructed. The database entails lab-specific information such as addresses, lab-functions, fields of work, contact persons, available instrumentation, interest for collaborations, commodity scope, pesticide scope etc.. Laboratories and its registered members (contact persons) will be able to submit and update their profiles online thus allowing the EURLs to delegate the cumbersome task of data updating to the NRLs and official laboratories. The database should further allow customized offline and online searches to quickly select/filter specific laboratories having common functions or profiles (e.g. NRLs or official laboratories dealing with the same commodities or pesticides etc.). A further aim of this database is to facilitate the communication between lab-members and strengthen the laboratory network. Tools for the visualization of the network in maps are also planned in this context.

Task: In 2011 structural improvement and collection of data

Period: see Table 1

A.6.2.6 EUPT-Archive Database

Background: Among the duties of the EURLs is to improve the performance of the official laboratories within the network with proficiency tests (EUPTs) being one of the most important tools of monitoring this process. Currently 3-5 EUPTs are performed annually by the 4 EURLs dealing with pesticides with lot's of data being generated every year. The evaluation of the laboratory performance over the years is difficult not only because of the great amount of data incurred but also because of the obligatory lab-coding in the reports requiring the availability of the respective lab-code/lab-name keys.

The database should allow the systematic archiving of the EUPT-data of all EURLs in order to improve the overview and enable the evaluation of the overall performance of official laboratories and countries throughout the EUPTs and the years. The database should further allow the storage of further PT-related information such as a) the explanations given by official laboratories for their non-participation in EUPTs, b) the explanations for the non-analysis of certain pesticides within the EUPT-scope and c) the information given by the labs as regards the traceability investigations and the corrective measures taken in case of bad performance.

In a second step appropriate filters and sorting options will be installed to allow customized EUPT-, laboratory- or pesticide-specific searches on-line. Using appropriate filters the EURLs and the COM should be able to easily obtain answers and conclusions for example as regards the variability of results over the years for one or more compounds or for one or more labs. The access of the laboratories to their own EUPT-data via their own profile site should help them get an overview of their long-term performance and to demonstrate their performance and the associated corrective measures during audits and inspections in a well documented manner.

The EUPT-Archive DB is a collaboration project between EURL-SRM and the EURL-FV and will be realized in close cooperation with the other two pesticide related EURLs and the COM.

Task: In 2011 the database will be further upgraded in collaboration with the EURL-FV to improve convenient data retrieval. Data collection will be continued.

Period: see Table 1

B. Development and Validation of Analytical Methods

B.1 Method for simultaneous analysis of polar pesticides

Background: Multiresidue methods aim to cover pesticides of a broad polarity range. However, there are some limitations especially towards the polar end of the range, because polar matrix components, such as sugars and proteins, tend to negatively affect chromatography and detection. Current multiresidue procedures are thus designed to remove those interfering components during partitioning and cleanup. This, however, also inevitably results in a loss of some very polar but still important pesticides. Not being amenable to multiresidue procedures, such pesticides have thus traditionally been a weak point in routine pesticide residue surveillance.

The EURL-SRM has already developed a method for the simultaneous analysis of the several highly polar pesticides including ethephon, glyphosate, glufosinate, maleic hydrazide and fosetyl aluminium and some metabolites thereof. The method involves a common extraction followed by LC-MS/MS analysis in groups.

Task: Further method development will be performed to expand the scope of the method by some additional highly polar pesticides and metabolites considering compounds included in the EU coordinated control program where reasonable and applicable including:

- N-Acetylglufosinate (metabolite of Glufosinate)
- Phosphorous Acid (metabolite of Fosetyl)
- Triazole metabolites (1,2,4-Triazole (T), triazole alanine (TA), triazolyl acetic acid (TAA))
- Cyromazine

Period: throughout the year

Deliverables: Update of method reports in Website in H2 2011

B.2 Study of pesticides requiring modified multi-residue methods

Background: Several pesticides and legally relevant metabolites are known to pose problems in analysis and are thus considered as “difficult” or non-amenable to multiresidue methods. In many cases analysis is possible following certain modifications of traditional multiresidue methods. Such modifications may entail pH-adjustment, temperature control, special measurement conditions, cleavage reactions to release conjugates etc..

Task: The experiments and studies to identify, characterize and group these types of pesticides will be continued. Modifications of the multiresidue methods will be introduced and communicated to the laboratories within the network. Priority will be given to pesticides and metabolites of high relevance in agriculture or those included in coordinated control plans of the EU.

Period: throughout the year

Deliverables: Reports in Website by H2 2011 and in 2012

B.3 Examination of existing analytical procedures for dithiocarbamates in order to evaluate their practical usefulness for routine pesticide residue testing in accordance with regulatory requirements

Background: Dithiocarbamates (DTCs) are among the pesticides most widely used in agriculture. The extreme instability of the polymeric dithiocarbamates makes their direct analysis virtually impossible. MRLs are thus traditionally referring to the common carbon disulfide moiety. This analysis involves a cleavage step followed by the analysis of the released CS₂. This has been traditionally performed using a photometer, following a derivatization of the CS₂. More and more used is the gas chromatographic determination of the CS₂ following its partitioning into a non-polar solvent. The common moiety approach does, however, not allow a differentiation between the individual DTCs, which may be important due to differences in the toxicology. For this reason alternative analytical procedures have been developed allowing the differentiated determination of the most important groups of the DTCs, i.e. the propylene-bis-dithiocarbamates (propineb) and the ethylene-bis-dithiocarbamates (maneb, mancozeb, nabam) as well as N,N-dimethyl-dithio-carbamates (ziram, ferbam) as their corresponding monomers or common moieties. Commission Directive 2007/57 requires the application of methods for the differentiated analysis of propineb (as propylenediamine), ziram and thiram on a case by case basis when specific quantification is required. The applicability of the current residue definitions and the existing analytical approaches in routine pesticide laboratories will be checked. A further aspect of interest in this respect is the comparison between the GC- and photometric

methods for dithiocarbamates determined as CS2 to find possible reasons for the bias in the mean results observed in the EUPT-SRM3. The influence of the DTC-type as well as the cleavage conditions and the matrix are to be studied.

Tasks: The project will be continued with the further examination of approaches for the analysis of dithiocarbamates and the assessment of their practical usefulness in the light of the existing regulations and considering technical and practical feasibility aspects. Consultations with a experts will continue.

Period: throughout the year

Deliverables: Position Document H2 2011 / H1 2012

B.4 Studies on the extractability of incurred pesticide residues

Background: Recoveries obtained in typical method validation experiments, where pesticides are spiked to sample homogenates in the lab, do not necessarily reflect the extractability rates achieved for incurred residues (resulting from the application of pesticides during crop production). Incurred residues are not always easily accessible as they may be enclosed in cells or wax particles or may have even undergone strong non-covalent interactions with matrix sites. To achieve quantitative extraction, sample preparation should ensure that all residues are accessible and transferable to the extraction solvent.

Recent studies made by the CVUA Stuttgart have shown that incurred pesticides might require additional extraction time than the approximately 1 minute currently used for e.g. QuEChERS.

B.4.1 Extractability of Incurred Residues from Cereal Matrices

Task: The EURL-CF and SRM will collaboratively optimize the extraction time for residues of so-called multi and single method pesticides from cereal matrices. The EUPT-C test materials from 2007, 2008, 2009, 2010 and/or 2011 as well as real samples will be used for this study.

Period: throughout the year

Deliverables: Report in website in H1 2012

B.4.2 Extractability of Incurred Residues from Fruit and Vegetables

Task: The EURL-FV and SRM will collaboratively optimize the extraction time for residues of so-called multi and single method pesticides from fruit and vegetable matrices. Past EUPT-FV and SRM test materials as well as real samples will be used for this study.

Period: throughout the year

Deliverables: Report in website in H1 2012

B.5 Studies on the analysis of acidic pesticides their esters and conjugates

Background: Residue definitions concerning acidic pesticides include sometimes only the free acids and sometimes additionally their esters and conjugates. The analytical approach to be followed depends on the residue definition. Esters and conjugates are typically hydrolyzed via alkaline hydrolysis to the free acids which are then determined. It has been noticed, however, that certain types of esters and conjugates do not fully hydrolyze via alkaline hydrolysis. And that hydrolysis via esterase enzymes seems to be a promising alternative.

Task: The EURL-SRM will conduct experiments to find out how various pesticide esters and conjugated acids (from incurred EUPT-samples) behave during alkaline hydrolysis and examine how enzymatic hydrolysis can help to optimize analysis.

Deliverables: Method protocol in website in H2 2011

C. Quality Assurance and Quality Control

C.1 Performance of an Interlaboratory Proficiency Test for “single residue analytes” in 2011 together with the EURL-CF (EUPT-SRM06)

Background: All EURLs have to annually organize proficiency tests directed to official laboratories and NRLs. The EURL-SRM is organizing its EUPTs alternating in collaboration with the EURLs for FV and CF.

Task: A proficiency test covering single residue methods (SRM) will be performed in collaboration with the EURL-CF.

Participants will be able to receive documents and instructions through the specific section of the EURL website.

Each participant will receive a detailed electronic report, which will allow the laboratories to interpret their results and also to identify possible sources of procedural errors.

A final report summarizing the scope, results, data treatment and additional information of the methods used will be printed and made available to every participant laboratory.

Period: H1 of 2011

Deliverables: Report of EUPT by December 2011

D. Technical and Scientific Support to NRLs/EU official labs and Third Country Labs

D.1 Dissemination of Information and Networking

The dissemination of information to NRLs, OLs and third country labs is achieved via personal communication and presentations in conferences and workshops (see D.2 and D.3) as well as with the help of the EURL-Web-Portal (A.6.1) and the EURL-Datapool (A.6.2).

The networking promotion is achieved via personal contacts including e-mails and telephone calls, the conduction of workshops as well with the help of the comprehensive Network-DB (see A.6.2.5).

D.2 Joint Training-Workshop for NRLs in Germany in cooperation with EURL-AO

A training-workshop will be performed in collaboration with the other 3 EURLs on pesticides. Corresponding NRLs from selected countries will be invited to participate.

The training-workshop will cover technical aspects as well as lectures and discussions on analytical and QC aspects. Special needs and problems of the laboratories selected to participate will be considered in the design of the training program.

Period: *To be decided*

Deliverables: Report and feedback evaluation within 4 months of the workshop

D.3 Visit of one NRL and in-situ Seminar

NRL(s) of one country will be jointly visited by representatives from the EURL-SRM and EURL-FV. The laboratory will be selected in agreement with DG-SANCO giving emphasis on NRLs that have performed poorly or not participated in EUPTs over last four years.

Prior to the inspection a detailed study of the EUPT results obtained during the last four years will be carried out. During the visit the possible reasons for the bad performance will be discussed, and advices will be given to the laboratory to improve its performance and expand the analytical scope. The objective will be to evaluate "in situ" the technical capabilities of the selected NRL(s) and the other OFLs in the country as well as to suggest ways on how to promote future improvement. The visit will also involve a training seminar. The EURL-SRM will send 2 representatives to this visit. This task will be performed in collaboration with the EURL-FV.

Period: *To be decided*

Deliverables: Visit report within 4 months of the visit

D.4 Analysis of official samples, counter analysis

The EURL will ask the Commission for approval of any activity this concerning and request for additional eligible budget, if required.