The rules for pesticide residues in food

BENAKI
PHYTOPATHOLOGICAL
INSTITUTE

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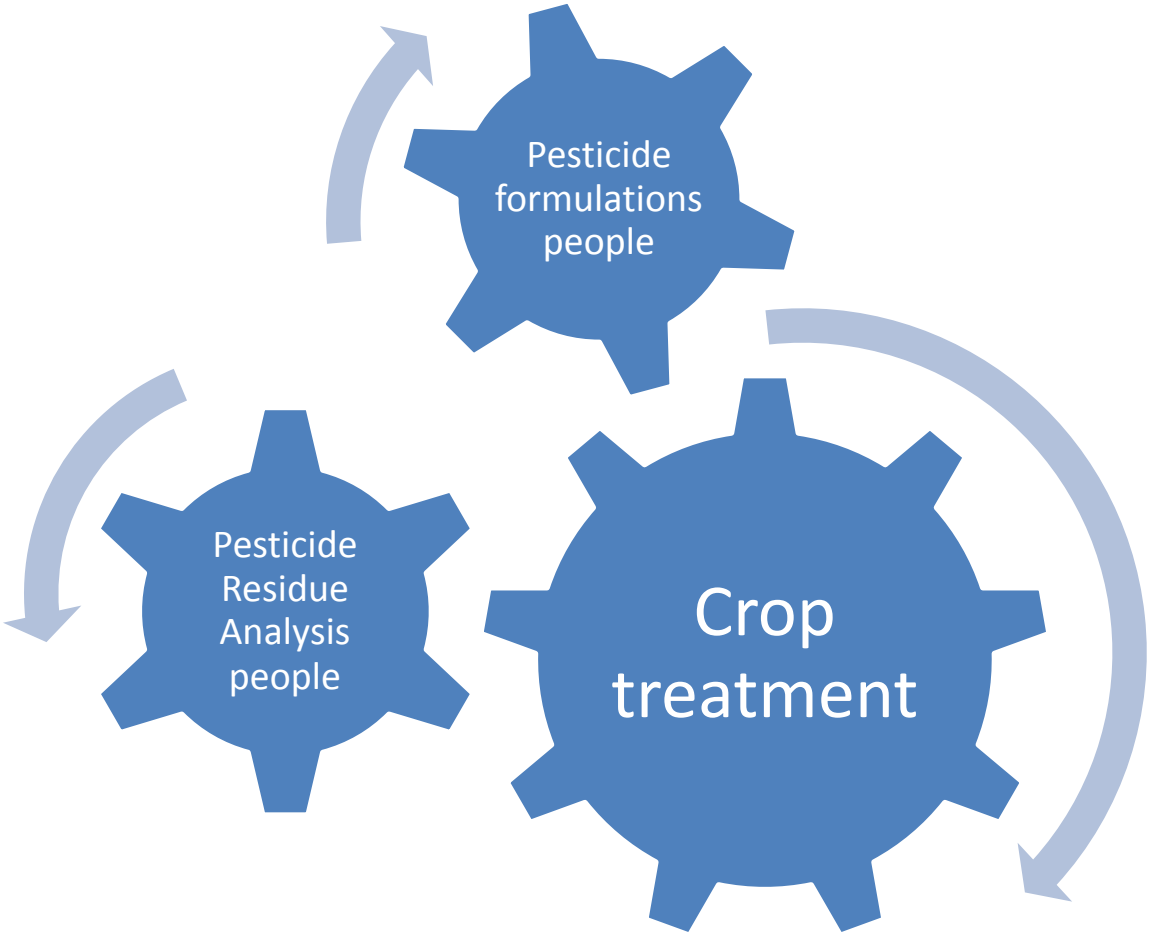
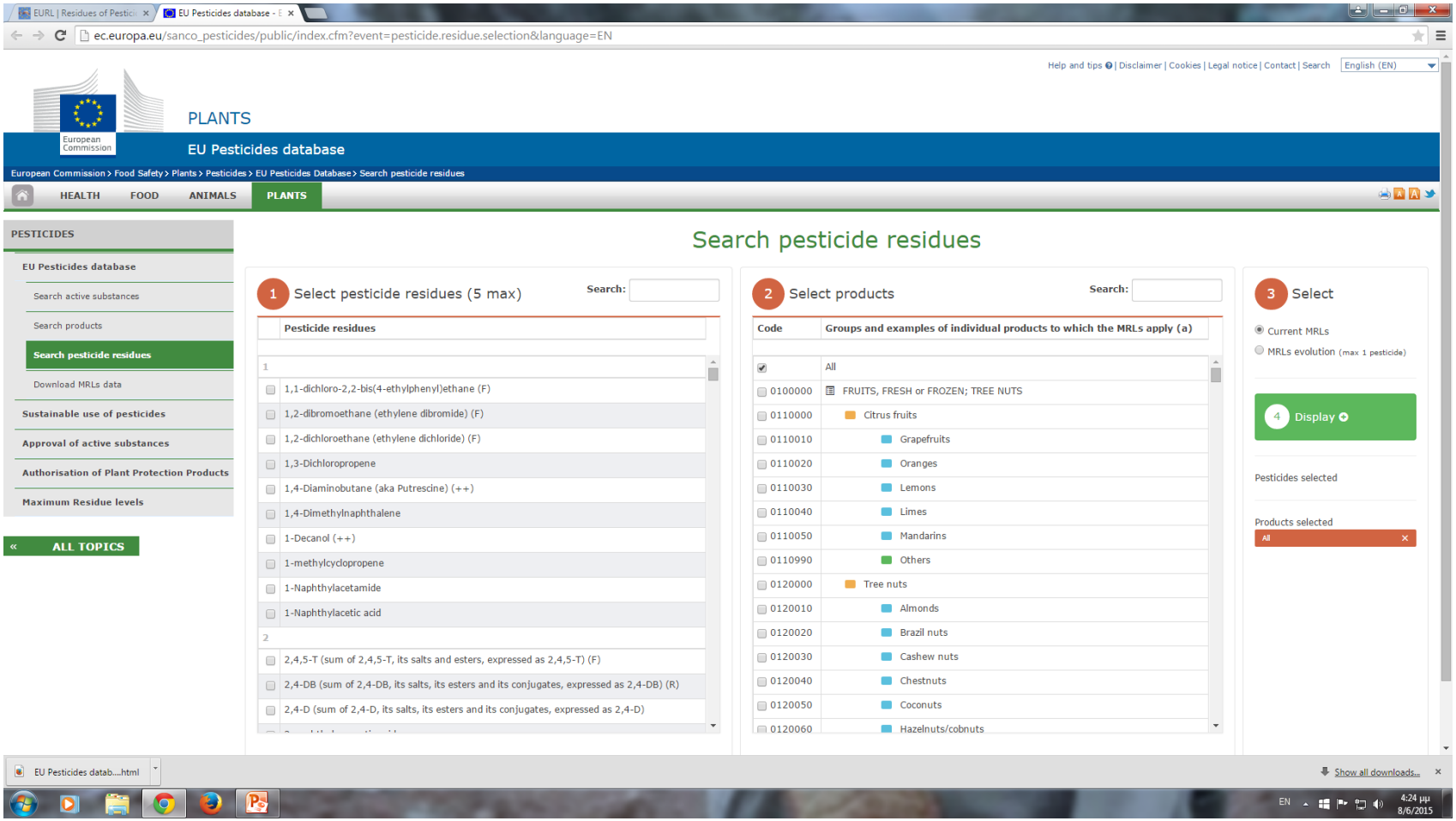
- **What is a pesticide?**
  - **A "pesticide" is something that prevents or controls a harmful organism ("pest") or disease or protects plants or plant products during production, storage and transport (herbicides, fungicides, insecticides, acaricides, nematicides etc.).**
- **What is a Plant Protection Product (PPP)?**
  - **PPPs are "pesticides" that protect crops or desirable or useful plants.**
  - **They contain at least one active substance and may also contain other components including safeners and synergists.**
  - **EU countries authorise PPPs and ensure compliance with EU rules.**


Pesticide formulations people
Pesticide Residue Analysis people
Crop treatment

- **What is an active substance?**
  - **An active substance is any chemical, plant extract, pheromone or micro-organism that has action against "pests" or on plants, parts of plants or plant products.**
  - **Before an active substance can be used within a PPP in the EU, it must be approved by the European Commission (Substances undergo an intensive evaluation).**
- **What is the difference between pesticides and PPPs?**
  - **The most common use of pesticides is in form of PPPs**
  - **The term "pesticide" is often used interchangeably with PPP, however, pesticide is a broader term that also covers non plant/crop uses.**

- **In the EU no PPPs can be used unless it has first been scientifically established that:**
  - **They have no harmful effects on consumers, farmers**
  - **They do not provoke unacceptable effects on the environment**
  - **They are sufficiently effective**
- **Maximum Residue Levels (MRLs)**
  - **The trace amounts of pesticides leave in treated products are called "residues"**
  - **A maximum residue level (MRL) is the highest level that is legally tolerated in or on food or feed.**
  - **The amounts of residues found in food must be safe for consumers and must be as low as possible**

- **Maximum Residue Levels (MRLs), continuing**
  - **Regulation (EC) No 396/2005 establishes the MRL of pesticides permitted in products of plant or animal origin intended for human or animal consumption. MRLs are derived after comprehensive assessment of the**
    - **Properties of the active substance**
    - **Residue levels resulting from the good agricultural practices (quantity, frequency, growth stage of the plant) defined for the treated crops (experimental data).**
    - **Producers of PPPs should provide data regarding Chronic toxicity with Acceptable Daily Intake (ADI) and acute toxicity with Acute Reference Dose (ARfD). The intake of residues through all food is compared with ADI and ARfD.**
  - **The European Commission fixes MRLs for all food and animal feed**
  - **The MRLs for all crops and all pesticides can be found in the MRL database on the commission website.**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Search active substances
Search products
Search pesticide residues
Download MRLs data
Sustainable use of pesticides
Approval of active substances
Authorisation of Plant Protection Products
Maximum Residue levels
« ALL TOPICS
Search pesticide residues
1 Select pesticide residues (5 max)
Search:
Pesticide residues
1
1,1-dichloro-2,2-bis(4-ethylphenyl)ethane (F)
1,2-dibromoethane (ethylene dibromide) (F)
1,2-dichloroethane (ethylene dichloride) (F)
1,3-Dichloropropene
1,4-Diaminobutane (aka Putrescine) (++)
1,4-Dimethylnaphthalene
1-Decanol (++)
1-methylcyclopropene
1-Naphthylacetamide
1-Naphthylacetic acid
2
2,4,5-T (sum of 2,4,5-T, its salts and esters, expressed as 2,4,5-T) (F)
2,4-DB (sum of 2,4-DB, its salts, its esters and its conjugates, expressed as 2,4-DB) (R)
2,4-D (sum of 2,4-D, its salts, its esters and its conjugates, expressed as 2,4-D)
2 Select products
Search:
Code
Groups and examples of individual products to which the MRLs apply (a)
All
0100000 FRUITS, FRESH or FROZEN; TREE NUTS
0110000 Citrus fruits
0110010 Grapefruits
0110020 Oranges
0110030 Lemons
0110040 Limes
0110050 Mandarins
0110990 Others
0120000 Tree nuts
0120010 Almonds
0120020 Brazil nuts
0120030 Cashew nuts
0120040 Chestnuts
0120050 Coconuts
0120060 Hazelnuts/cobnuts
3 Select
Current MRLs
MRLs evolution (max 1 pesticide)
4 Display
Pesticides selected
Products selected
All
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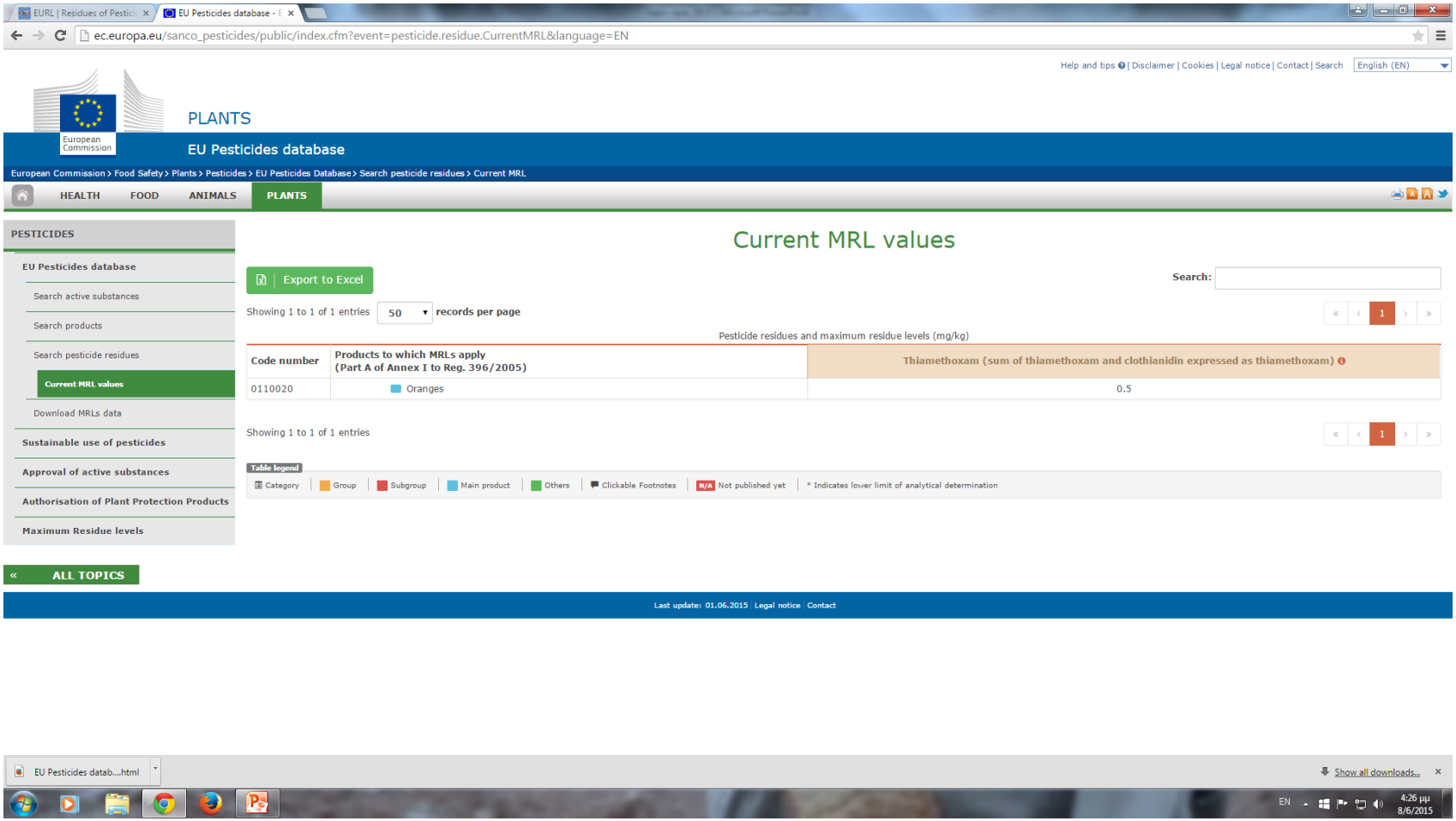
- **In total: 378 products for 1315 entries (compounds, approved, not approved, pending or not a plant protection product like piperonyl butoxide).**
- **Practically the laboratories have to determine less compounds.**
- **All the samples for the Pesticide Residue Analysis (PRA) people are of “unknown” origin**

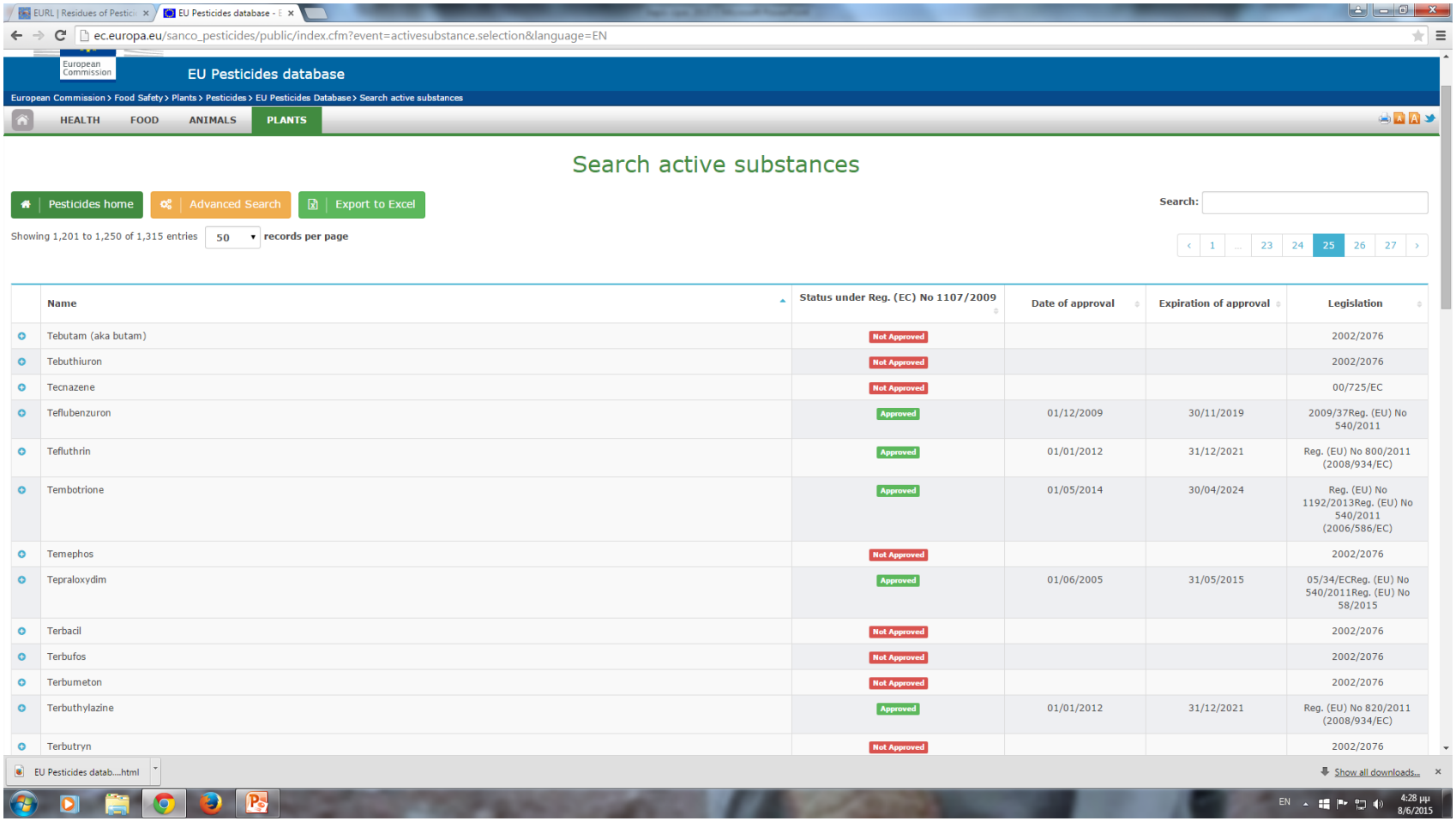
- **The European Food Safety Authority (EFSA) assesses the safety for consumers. EFSA's Pesticide Unit is responsible for the risk assessment of MRLs in accordance with the legislation.**
- **The EFSA's Pesticide Unit in collaboration with Member States is reviewing the scientific basis of excising MRLs and performs consumer risk assessments to ensure that MRLs established in the past are compliant with the data requirements and safe for the consumers.**

- **The MRL team, part of the Pesticides Unit, provides independent scientific advice to the Commission on Maximum Residue Levels (MRLs) of pesticides in or on food and feed.**
- **The team is responsible for:**
- **assessing the potential risks to consumer health arising from existing MRLs or new MRLs applications**
- **assessing the potential risks to consumer health arising from active substances for which MRLs are not required**
- **developing and maintaining databases on information related to MRLs**
- **drawing up of the Annual Report on Pesticide Residues**
- **assessing the consumer exposure to pesticide residues on the basis of the residue findings in monitoring programmes**

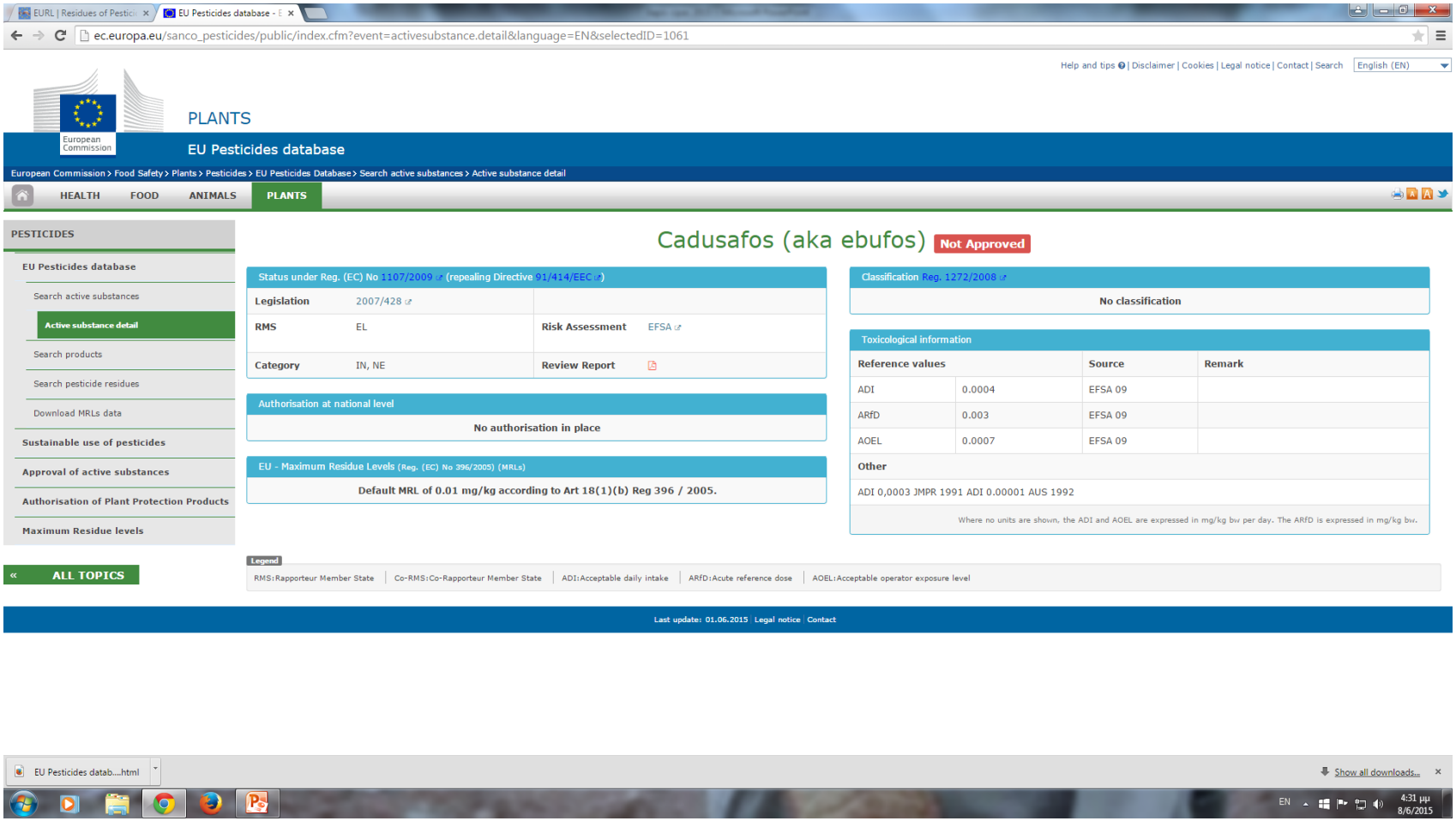
Cipac symposium



Cipac symposium



Name	Status under Reg. (EC) No 1107/2009	Date of approval	Expiration of approval	Legislation
Tebutam (aka butam)	Not Approved			2002/2076
Tebuthiuron	Not Approved			2002/2076
Tecnazene	Not Approved			00/725/EC
Teflubenzuron	Approved	01/12/2009	30/11/2019	2009/37Reg. (EU) No 540/2011
Tefluthrin	Approved	01/01/2012	31/12/2021	Reg. (EU) No 800/2011 (2008/934/EC)
Tembotrione	Approved	01/05/2014	30/04/2024	Reg. (EU) No 1192/2013Reg. (EU) No 540/2011 (2006/586/EC)
Temephos	Not Approved			2002/2076
Tepraloxydim	Approved	01/06/2005	31/05/2015	05/34/ECReg. (EU) No 540/2011Reg. (EU) No 58/2015
Terbacil	Not Approved			2002/2076
Terbufos	Not Approved			2002/2076
Terbumeton	Not Approved			2002/2076
Terbuthylazine	Approved	01/01/2012	31/12/2021	Reg. (EU) No 820/2011 (2008/934/EC)
Terbutryn	Not Approved			2002/2076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Search products
Search pesticide residues
Download MRLs data
Sustainable use of pesticides
Approval of active substances
Authorisation of Plant Protection Products
Maximum Residue levels
« ALL TOPICS
Cadusafos (aka ebufos) Not Approved
Status under Reg. (EC) No 1107/2009 (repealing Directive 91/414/EEC)
Legislation 2007/428
RMS EL
Risk Assessment EFSA
Category IN, NE
Review Report
Authorisation at national level
No authorisation in place
EU - Maximum Residue Levels (Reg. (EC) No 396/2005) (MRLs)
Default MRL of 0.01 mg/kg according to Art 18(1)(b) Reg 396 / 2005.
Classification Reg. 1272/2008
No classification
Toxicological information
Reference values
Source
Remark
ADI 0.0004 EFSA 09
ARfD 0.003 EFSA 09
AOEL 0.0007 EFSA 09
Other
ADI 0,0003 JMPR 1991 ADI 0.00001 AUS 1992
Where no units are shown, the ADI and AOEL are expressed in mg/kg bw per day. The ARfD is expressed in mg/kg bw.
Legend
RMS:Rapporteur Member State | Co-RMS:Co-Rapporteur Member State | ADI:Acceptable daily intake | ARfD:Acute reference dose | AOEL:Acceptable operator exposure level
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- **The requirements for PRA.**
  - **We have to deal with samples of "unknown" origin.**
  - **We have to deal with concentrations of three orders of magnitude (from 0.01 mg/kg to 10 mg/kg). "Unknown" concentration.**
  - **No international or European agreement on methods.**
  - **No standardised methods of analysis.**
  - **The method reporting level should be set at 0.01 mg/kg. This concentration is a requirement for the vast majority of Proficiency Test organised in EU (compulsory for official labs). Additionally for many compounds a general default MRL of 0.01 (which is the lowest limit of analytical determination, LOD) for the cases on which the pesticide has not been used and for other cases.**
  - **The PRA people need expensive equipment to cover the requirements:**
    - **LC/MS/MS**
    - **GC/MS/MS**

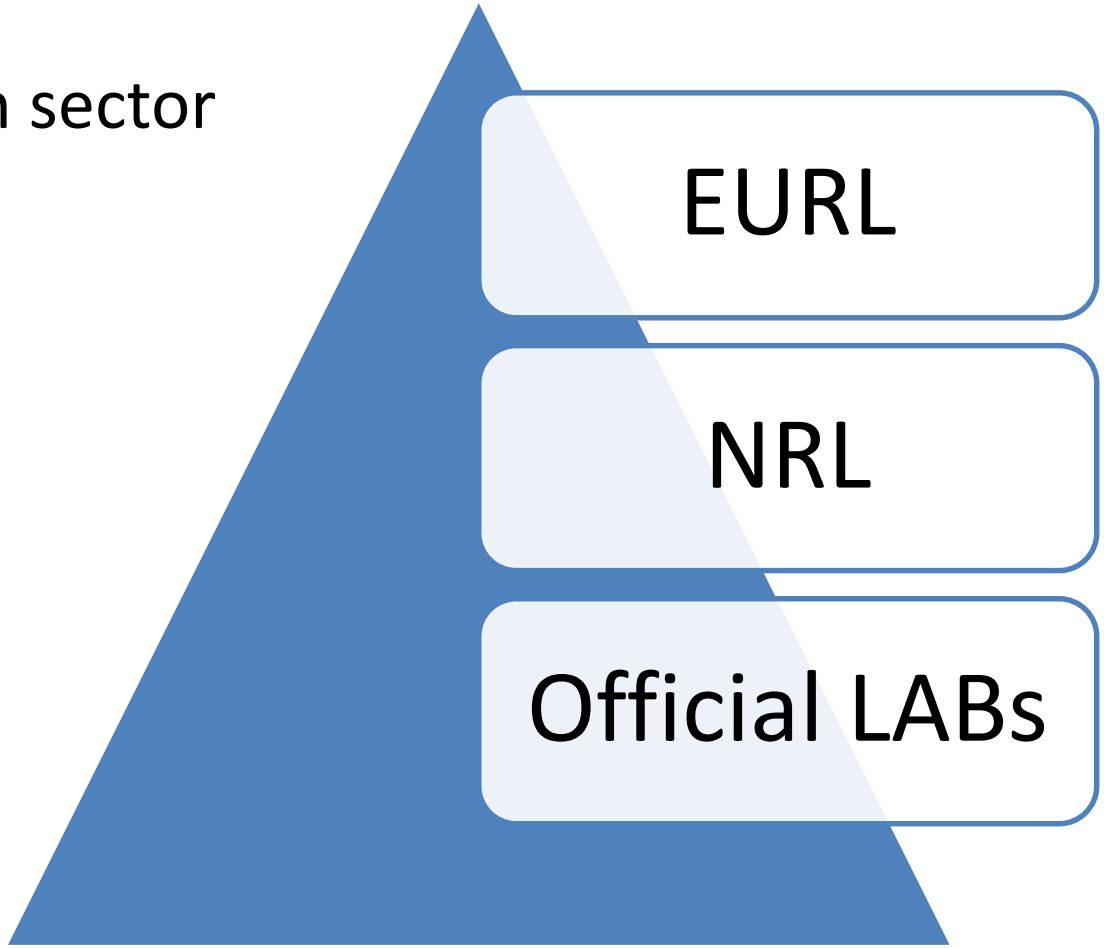
- **The requirements for PRA (continuing)**
  - **Multiresidue methods (our laboratory covers about 400 compounds) including parent compounds, isomers and metabolites according to legislation.**
  - **Reporting levels set at 0.01 mg/kg (for the most of compounds)**
  - **The analysis is "target" analysis. We know the retention times and transitions for LC/MS/MS & GC/MS/MS chromatographic analysis.**
  - **The lab must be accredited (especially the state labs).**
  - **Each lab has its own method although many labs use the very well known QuEChERS method and a lot of labs use the ethyl acetate method.**
  - **No mater if the pesticide residues are coming from parallel or illegal trade or from formulations from different producer of ppps.**

- **The requirements for PRA (continuing)**
  - **PRA is a dynamic case. Labs must increase continuously the number of target compounds in order to check the samples most effectively.**
  - **Multiresidue methods cannot cover all the compounds (which is due to physicochemical properties of compounds).**
  - **Our lab have many Single Residue Methods (SRM) as well like:**
    - **For dithiocarbamates (as CS2)**
    - **For acidic pesticides, like 2,4 D, MCPA etc.**
    - **For inorganic bromide**
    - **For glyphosate and ethephon**
    - **For amitraz and its metabolites**
    - **For chlormequat and mepiquat**
    - **And others**

- **The requirements for PRA (continuing)**
  - **Target analysis: we know the compound and the chromatographic data and analytical standards are available in the lab**
  - **Non-target analysis: we know the compounds, but not available analytical standards in the lab or in the market.**
  - **Unknown analysis: no data for the compound (unknown compounds).**
  - **Screening methods: using mainly the following systems:**
    - **LC/MS/TOF (pulsed detector) for non target analysis with collaboration of data-bases, LC/MS/ORBITRAP**
    - **GC/MS/TOF (pulsed detector)**
    - **GC/MS – full scan or GC/MS/ION TRAP (pulsed detector)**
    - **GC/NPD (isofenphos methyl) or even GC/ECD**

- **Four sectors for PRA**
  - **Fruits & Vegetables**
  - **Cereals & Feeding Stuff**
  - **Animal origin (the products of high fat content are included as well)**
  - **Single Residue Methods**
- **The concept of the EU Reference Laboratories (EURLs, former CRLs) and National Reference Laboratories (NRLs) is layed down in the Regulation (EC) No 882/2004 of the European Parliament and of the Council. The overall objective of the EURLs and NRLs is to improve the quality, accuracy and comparability of the results at official control laboratories.**

For each sector



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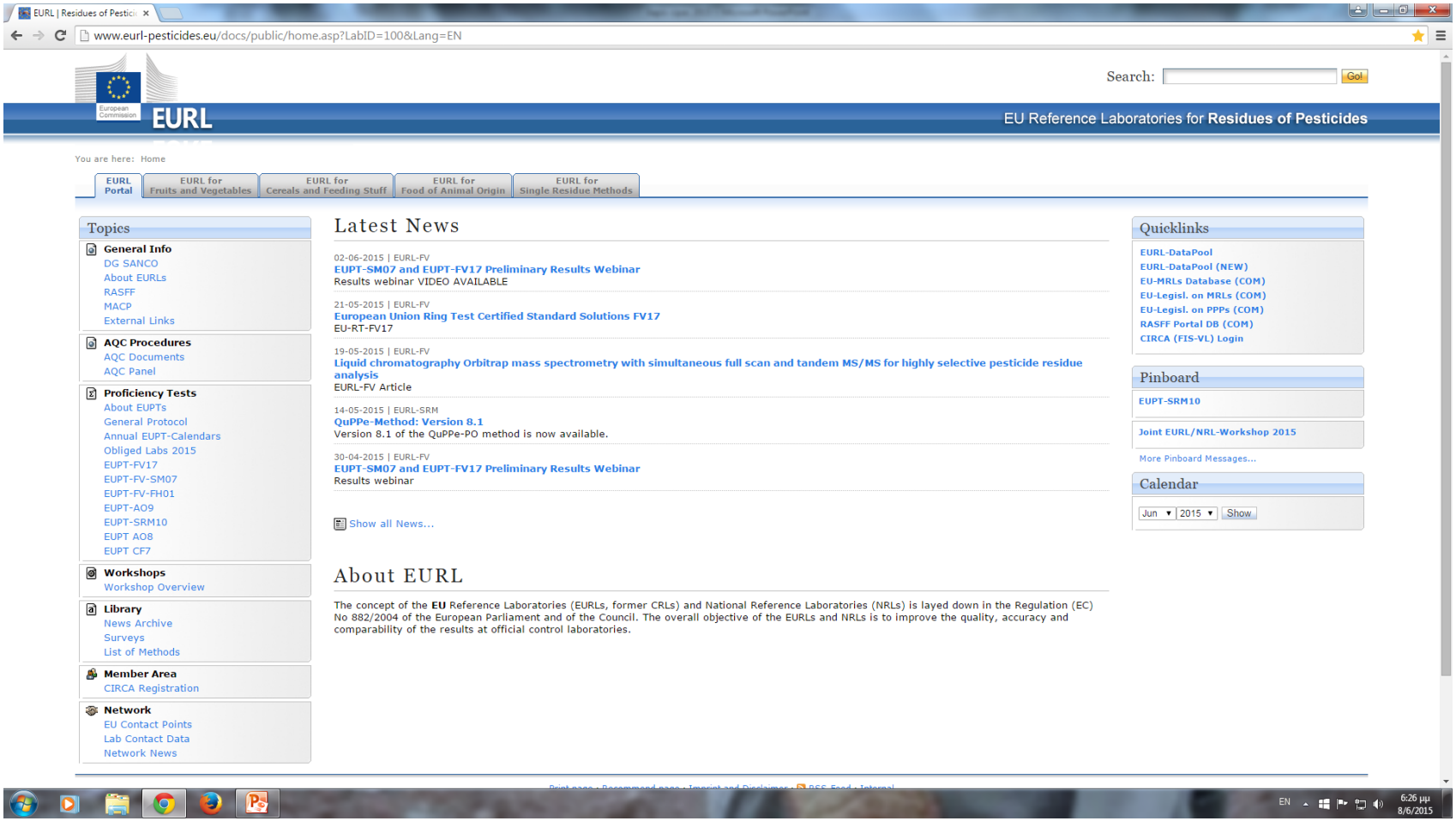

- **Obligations of NRLs and Official labs**
  - **Accreditation (as already mentioned)**
  - **Follow the SANCO (SANCO/12571/2013) "Guidance document on analytical quality control and validation procedures for pesticide residues analysis in food and feed" implemented from 01/01/2014. This document is revised regularly every two years. The NRLs should participate in this procedure.**
  - **Compulsory participation to Proficiency Tests organized by EURLs on behalf of the European Commission, DG-SANTÉ (European Commission, Health and Consumer Protection Directorate-General)**
  - **With results it is compulsory to include the Uncertainty at 95% level (±50%). The labs (NRL & Official) cannot use their own Uncertainty.**

- **Coordinated multiannual control programs. Commission implementing regulation (eu) no 400/2014 for 2015, 2016 and 2017 to ensure compliance with maximum residue levels of pesticides and to assess the consumer exposure to pesticide residues in and on food of plant and animal origin.**
- **National programs**
- **Commission Regulation (EC) No 669/2009 (and its amendments) of 24 July 2009 implementing Regulation (EC) No 882/2004 of the European Parliament and of the Council as regards the increased level of official controls on imports of certain feed and food of non-animal origin.**

- **In the framework of the 2013 EU-coordinated programme under Regulation (EC) No 788/2012, reporting countries were requested to analyse 12 different food products.**
- **In total, 11 582 samples were analysed in the framework of the EU-coordinated monitoring programme. Overall, 0.9 % of the samples exceeded the MRL (113 samples); 0.5 % of the samples were found to be non-compliant with the legal limit, taking into account the measurement uncertainty. The number of samples with measurable residues but within the legally permitted level was 5 353 (46.3 %). In 52.8 % of the samples (6 116 samples), no quantifiable residues were found (residues below the LOQ).**
- **Samples containing more than one pesticide in individual samples (multiple residues) were found in all food products. The products with the highest percentage of samples with multiple residues were strawberries (63 %), peaches (53 %), apples (46 %) and lettuce (36 %).**

- **Monitoring information on pesticide residues (from all the programmes) in food received from EFSA from 27 EU Member States and two EFTA countries (Iceland and Norway)**
- **The EU monitoring programmes are one of the most comprehensive food survey programmes worldwide, covering more than 15 million determinations yearly (1 determination= 1 combination of 1 compound with 1 product)**
- **More than 60.000 food samples every year which are analysed for up to 800 (approximately) different pesticides. Not all the compounds have the same determinations for example (National Pr. of 2013): cyfluthrin: 51.968 determinations (26 countries), cyromazine: 23.805 determinations (19 countries) and butachlor: 5.392 determinations (9 countries).**

Thank you for the invitation and for your time