



**Pesticide
Action
Network**
Europe

Tools for a better
understanding of
cumulative
interactions – An
NGO perspective

Martin Dermine, DVM, PhD
Future of harmonized pesticides risk assessment
conference – BfR – Berlin – 23-24 November 2017

Pesticide legislation (Reg. 1007/2008, 396/2005)



- Strictest system in the world
- No harmful effect on human health, no unacceptable effect on the environment
- Establishment of a risk assessment for cumulative and synergistic effects of combined exposure: request from legislator since 2005
- Protection of vulnerable groups is a priority, including all individuals

Current pesticide R.A./R.M. insufficient to protect people...



SCIENTIFIC OPINION



ADOPTED: 14 December 2016

doi: 10.2903/j.efsa.2017.4691

Investigation into experimental toxicological properties of plant protection products having a potential link to Parkinson's disease and childhood leukaemia¹

EFSA Panel on Plant Protection Products and their residues (PPR),
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Sandro Grilli, Antonio F Hernandez-Jerez, Susanne Hougaard Bennekou, Michael Klein,
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Abstract

In 2013, EFSA published a literature review on epidemiological studies linking exposure to pesticides and human health outcome. As a follow up, the EFSA Panel on Plant Protection Products and their residues (PPR Panel) was requested to investigate the plausible involvement of pesticide exposure as a risk factor for Parkinson's disease (PD) and childhood leukaemia (CHL). A systematic literature review on PD and CHL and mode of actions for pesticides was published by EFSA in 2016 and used as background

Current pesticide R.A./R.M. insufficient to protect people...



Fruit and vegetable intake and their pesticide residues in relation to semen quality among men from a fertility clinic

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Submitted on November 4, 2014; resubmitted on January 9, 2015; accepted on February 3, 2015

Chiu *et al.* 2015

Association Between Pesticide Residue Intake From Consumption of Fruits and Vegetables and Pregnancy Outcomes Among Women Undergoing Infertility Treatment With Assisted Reproductive Technology

Yu-Han Chiu, MD, ScD; Paige L. Williams, PhD; Matthew W. Gillman, MD, SM; Audrey J. Gaskins, ScD; Lidia Mínguez-Alarcón, PhD; Irene Souter, MD; Thomas L. Toth, MD; Jennifer B. Ford, RN; Russ Hauser, MD, ScD; Jorge E. Chavarro, MD, ScD; for the EARTH Study Team

Chiu *et al.* 2017

Current pesticide R.A./R.M. insufficient to protect people...



Instituts
thématiques



Inserm



Institut national
de la santé et de la recherche médicale

Paris, June 12, 2013

Press release

Pesticides and their effect on health

An Inserm group of experts

Since the eighties, epidemiological research has been looking into how pesticides are involved in several pathologies in persons who are exposed to these substances in the course of their work, in particular cancerous pathologies, neurological pathologies and reproductive disorders. These investigations have highlighted the potential effects of even low levels of exposure during the sensitive periods of development (in utero and during childhood).

In this context, the DGS (Direction Générale de la santé – the public health authority)

INSERM 2013

Current pesticide risk assessment



- Single route of exposure
- Single chemical: outdated
- Acceptable daily intake :
 - Interspecific safety factor of 10 insufficient (Schneider 2005 >10, Falk-Filipsson 2007 >15)
 - Intraspecific factor of 10 insufficient to protect vulnerable groups (Dorne 2001).
- Uncertainty factor of 100 not sufficient for single route/substance risk assessment.
- Need for extra safety factor (x10)

Use of probabilistic models



- Probabilities: not in line with reg. 1107/2009.
- Acropolis - Euromix = public – private partnership (PAN-E **Poisonous injection report**) - Col
- Based on ADIs, imperfect model
- Highly theoretical: e.g. Monte Carlo model: all citizens not protected (vulnerable groups+++)
- If 99.9% protection: 0.1% = 500 000 citizens

Cumulative Assessment Groups



- 2013 Scientific Opinion on Cumulative Assessment Groups (thyroid and nervous system)
- Grouping by targeted organs/cells – deterministic approach
- MoA/AOP not needed
- Data available (DARs, peer reviewed literature, pesticide residue databases)
- Development of CAGs-ADIs and CAGs-MRLs.

Cumulative Assessment Groups



1. Food pesticide residues monitoring data should be used to calculate CAG-MRLs
2. If CAG-residues $>$ MRL, food should not be consumed
3. If regular exceedance, restrictions should take place
4. New CAG-MRLs monitored and restrictions modified accordingly

Use of models in Risk Assessment



- Apply rules, no compromise (reg. 1107/2009, 396/2005)
- Apply precautionary principle
- Models are currently failing to protect the environment: actual pesticide concentration >>> predicted environmental concentrations
- Permanent re-evaluation / improvements

Adverse Outcome Pathways?



- Interesting tool: fundamental research
- In its infancy, not to be used in RA
- Improve understanding of cumulative/synergistic effects
- Future cut-off criteria to avoid higher tier testings?
- Not a method to refine risk assessment

Conclusions



- After 12 years, no assessment of combined exposure
- Evidence of hazard from cumulative exposure to low-doses is there (cumulative, synergies)
- Real-life matters: more than 25% of fruits/vegetables contain multiple residues
- Lack of action from RA/RM is not acceptable from a citizen point of view
- Complex ≠ impossible, need to start now



Thank you!