Bulletin de veille du Réseau des Ecotoxicologues de l'INRA

N°8, avril 2014

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Edito

Voici notre 8ème bulletin de veille. Nous poursuivons la construction de cette activité de veille, qui produit un bulletin dont la diffusion dépasse maintenant largement le cadre de l'INRA.

Nous entrons dans la période des principaux colloques (géographiquement proches) en écotoxicologie : SETAC, SEFA, AFEM-Ecotoxicologie microbienne… et serions preneurs des principales évolutions de la discipline que vous pourriez y noter, et des thématiques émergentes. Si vous avez des synthèses…

Nous rappelons également le rapport inter-alliances IFRES (http://www.allenvi.fr/actualites/2013/rapport-ifres) qui doit nous inciter à mieux nous fédérer pour répondre aux nouveaux enjeux proposés au niveau national.

Notre liste de diffusion (voir plus haut) est à votre disposition. Les messages diffusés par cette liste sont maintenant stockés sur la plateforme de veille. N'hésitez pas à l'utiliser.

Bonne lecture !

L'équipe de veille

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Sommaire

ERA / Publications scientifiques

European perspective on alternatives to animal testing for environmental hazard identification and risk assessment

Cet article rédigé par l'équipe du projet européen EUROECOTO*X est paru dans Regulatory Toxicology and Pharmacology*, Volume 67, Issue 3, December 2013, Pages 506-530.

EUROECOTOX
European Network for Alternative Testing Strategies in Ecotoxicology

Abstract: Tests with vertebrates are an integral part of environmental hazard identification and risk assessment of chemicals, plant protection products, pharmaceuticals, biocides, feed additives and effluents. These tests raise ethical and economic concerns and are considered a inappropriate for assessing all of the substances and effluents that require regulatory testing. Hence, there is a strong demand for replacement, reduction and refinement strategies and methods. However, until now alternative approaches have only rarely been used in regulatory settings. This review provides an overview on current regulations of chemicals and the requirements for animal tests in environmental hazard and risk assessment. It aims to highlight the potential areas for alternative approaches in environmental hazard identification and risk assessment. Perspectives and limitations of alternative approaches to animal tests using vertebrates in environmental toxicology, i.e. mainly fish and amphibians, are discussed.
http://www.sciencedirect.com/science/article/pii/S0273230013001797

Accès au document

Environmental monitoring points to widespread PBDE pollution

ChemicalWatch
GLOBAL RISK & REGULATION NEWS

Le site Chemical Watch met en avant deux études récentes. 8 May 2014 (United States, United Kingdom, Risk assessment)

Endocrine-disrupting pollutants may be affecting the health of river birds in South Wales, according to a study by a team from Cardiff and Exeter Universities and the University of Saskatchewan, Canada.

The team monitored Eurasian dippers nesting near urban and rural streams in Wales. Birds at urban sites had lower levels of thyroid hormones and poorer body condition, which the researchers suggest is linked to higher exposure to polychlorinated biphenyls (PCBs) and polybrominated diphenyl ethers (PBDEs). Next, the team plans to locate the sources of the pollution. The study is published in Environmental Toxicology and Chemistry.

Meanwhile, a US Geological Survey study has found PCBs and PBDEs at all sites, and in all fish sampled, in the lower Columbia River in Oregon and Washington.

In particular, they found examples of biomagnification of some of the PBDEs, where the contaminants enter the food web through organisms on the riverbed and are then taken up by predators such as fish and birds.

The results emphasise that contaminants in the environment can lead to bioaccumulation and potential negative effects in multiple levels of the food web, write the researchers in Science of the Total Environment. Their research also underlines the importance of monitoring different environmental compartments and trophic levels for chemicals, they add.

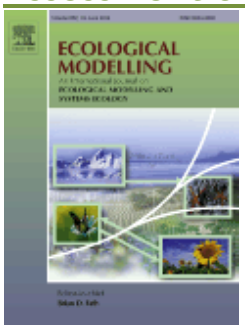
Les articles concernés sont :

Developmental impairment in eurasian dipper nestlings exposed to urban stream pollutants. paru dans la revue Environmental Toxicology

Foodweb transfer, sediment transport, and biological impacts of emerging and legacy organic contaminants in the lower Columbia River, Oregon and Washington, USA: USGS Contaminants and Habitat (ConHab) Project paru dans la revue Science of The Total Environment

ERA / Publications scientifiques / méthodes et pesticides

Population Models for Ecological Risk Assessment of Chemicals



Numéro spécial de la revue Ecological Modelling: Volume 280 (May 2014) Edited by Volker Grimm and Pernille Thorbek.

Volker Grimm présente ce numéro spécial : (extrait)

Ecological models, in particular population models, have long been discussed as a tool to make risk assessment of chemicals more ecologically relevant (Kendall and Lacher, 1994, Pastorok et al., 2002, Pastorok et al., 2003, Bartell et al., 2003, Forbes et al., 2009, Forbes and Calow, 2012 and Thorbek et al., 2010). They allow extrapolation from effects on individuals to effects on populations. So far, however, ecological modelling for risk assessment of chemicals has been mainly an academic exercise (Galic et al., 2010 and Schmolke et al., 2010a).

The main reasons for this are: scepticism among risk assessors in regulatory authorities and industry regarding the realism of population models, a lack of example models specifically developed for risk assessment that could serve as a proof of concept, and a lack of modellers well-trained not only in ecology and modelling but also in ecotoxicology and regulatory risk assessment.

To overcome this situation, CREAM (Mechanistic Effect Models for Ecological Risk Assessment of Chemicals), a European project including 20 PhD and three postdoctoral projects, was launched in 2009 and will end in summer 2014. CREAM is a "Marie Curie Initial Training Network (ITN)" funded by the European Commission (Grimm et al., 2009). The aims and scope of CREAM are: (1) Formulate and test guidance for good modelling practice that ensures transparent and reliable decision support for chemical risk assessment. (2) Develop well-tested ecological models for a range of organisms and ecosystems relevant for chemical risk assessments. (3) Provide training for the next generation of modellers, emphasizing transparency and rigorous model evaluation as core elements of models for decision support. To achieve these goals, scientists from the regulatory authorities and industry, as well as several young scientists, participated in CREAM activities together with CREAM's PhD students and postdocs.

In this Special Issue we present some results of the CREAM project and other projects closely associated with CREAM. Further publications are listed on http://cream-itn.eu/ or will appear in a special issue on "Ecological Models" in "Environmental Toxicology and Chemistry" (edited by N. Galic and V. Forbes). Table 1 gives an overview of the 12 contributions. Nine of them present case studies. They all address various aspects of capturing population-level risk from chemicals in the environment. Most models presented are agent- or individual-based, which are flexible enough to include basic behavioural mechanisms of organisms. The earthworm model by Johnston et al. (2014) and the wood pigeon model by Kułakowska et al. (2014) are such models, being based on energy budgets and adaptive decision making. The wood pigeon model is also a good example of using patterns in existing observations not only for calibrating model parameters but also for selecting the most appropriate submodels to represent key behaviours ('pattern-oriented modelling'; Grimm and Railsback, 2012). These two models have the highest potential of the models presented in this special issue to be used beyond the environment for which data and observations exist because they are based on submodels which can independently be parameterized for wide ranges of environmental conditions.

Accès au document

Influence of combined pesticide and parasite exposure on bumblebee colony traits in the laboratory

Authors: Fauser-Misslin, A; Sadd, B; Neumann, P; Sandrock, C

Source: JOURNAL OF APPLIED ECOLOGY, 51 (2):450-459; 10.1111/1365-2664.12188 APR 2014

Abstract: Pollinating insects provide vital ecosystem services of enormous importance for economies and biodiversity. Yet, there is a concerning global trend of pollinator declines. Parasites and pesticides are among the suspected principle drivers of these declines. However, especially in the case of key wild pollinators, there are insufficient data on the relative impact of these individual environmental stressors and whether they interact to increase detrimental effects. Using a fully crossed factorial design, we investigated how laboratory exposure to neonicotinoid insecticides, thiamethoxam and clothianidin, over a 9-week period and a prevalent trypanosome gut parasite Crithidia bombi affects various crucial colony traits of the bumblebee *Bombus terrestris*. (...) To help safeguard pollinator health, whole life-cycle fitness assessments, particularly for non-Apis bees, stringently incorporating chronic and sublethal side effects of pesticides, as well as interactions with common natural stressors, such as prevalent parasites, should be considered in the corresponding test guidelines.

Accès au document

ERA / Publications scientifiques / faune et pesticides

Using *Hexagenia* in sediment bioassays: Methods, applicability, and relative sensitivity

Authors: Harwood, AD; Rothert, AK; Lydy, MJ

Source: ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 33 (4):868-874; 10.1002/etc.2510 APR 2014

Abstract: The majority of sediment toxicity and aquatic bioaccumulation assessments are conducted using standardized species, such as *Hyalella azteca*, *Chironomus dilutus*, and *Lumbriculus variegatus*. The burrowing mayfly, Hexagenia sp., may serve as an ideal supplemental organism for both toxicity and bioaccumulation studies for several reasons. (...) This provides guidance for the use of this species in toxicological bioassays.

Accès au document

Extreme temperatures in the adult stage shape delayed effects of larval pesticide stress: A comparison between latitudes

Authors: Janssens, L; Van, KD; Stoks, R

Source: AQUATICTOXICOLOGY, 14874-82; 10.1016/j.aquatox.2014.01.002 MAR 2014

Abstract: Global warming and pesticide pollution are major threats for aquatic biodiversity. Yet, how pesticide effects are influenced by the increased frequency of extreme temperatures under global warming and how local thermal adaptation may mitigate these effects is unknown. We therefore investigated the combined impact of larval chlorpyrifos exposure, larval food stress and adult heat exposure on a set of fitness-related traits in replicated low- and high-latitude populations of the damselfly *Ischnura elegans*. (...) Firstly, the delayed effects of larval pesticide exposure on adult damselflies depended upon subsequent adult heat exposure, indicating that larval pesticide stress and adult heat stress interacted across metamorphosis. Secondly, low- and high-latitude animals responded differently to the imposed stressors, highlighting that intraspecific evolution along natural thermal gradients may shape sensitivity to pesticides.

Accès au document

Urban and agricultural pesticide inputs to a critical habitat for the threatened delta smelt (*Hypomesus transpacificus*)

Authors: Weston, DP; Asbell, AM; Lesmeister, SA; Teh, SJ; Lydy, MJ

Source: ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 33 (4):920-929; 10.1002/etc.2512 APR 2014

Abstract: The Cache Slough complex is an area of tidal sloughs in the Sacramento-San Joaquin River Delta of California (USA), and is surrounding by irrigated agricultural lands. Among the species of concern in the area is the delta smelt (*Hypomesus transpacificus*), a federally listed threatened species. Releases of the organophosphate insecticide chlorpyrifos and pyrethroid insecticides were examined to determine whether they represented a threat to the copepods on which delta smelt feed (*Eurytemora affinis* and *Pseudodiaptomus forbesi*) and to aquatic life in general, represented by the standard testing organism, *Hyalella azteca*. (...) The dominant pyrethroid source appeared to be urban runoff entering a creek 21 km upstream of Cache Slough. Pyrethroids of urban origin were supplemented by agricultural inputs of pyrethroids and chlorpyrifos as the creek flowed toward Cache Slough.

Accès au document

Risks of neonicotinoid insecticides to honeybees

Authors: Fairbrother, A; Purdy, J; Anderson, T; Fell,

Source: ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 33 (4):719-731; 10.1002/etc.2527 APR 2014

Abstract: The European honeybee, *Apis mellifera*, is an important pollinator of agricultural crops. Since 2006, when unexpectedly high colony losses were first reported, articles have proliferated in the popular press suggesting a range of possible causes and raising alarm over the general decline of bees. Suggested causes include pesticides, genetically modified crops, habitat fragmentation, and introduced diseases and parasites. Scientists have concluded that multiple factors in various combinations-including mites, fungi, viruses, and pesticides, as well as other factors such as reduction in forage, poor nutrition, and queen failure-are the most probable cause of elevated colony loss rates. (...) The authors describe how neonicotinoids interact with the nervous system of honeybees and affect individual honeybees in laboratory situations. Because honeybees are social insects, colony effects in semi field and field studies are discussed. The authors conclude with a review of current and proposed guidance in the United States and Europe for assessing the risks of pesticides to honeybees.

Accès au document

A meta-analysis comparing the sensitivity of bees to pesticides

Authors: Arena, M; Sgolastra, F

Source: ECOTOXICOLOGY, 23 (3):324-334; 10.1007/s10646-014-1190-1 APR 2014

Abstract: The honey bee *Apis mellifera*, te test species used in the current environmental risk assessment procedure, is generally considered as extremely sensitive to pesticides when compared to other bee species, although a quantitative approach for comparing the difference in sensitivity among bees has not yet been reported. A systematic review of the relevant literature on the topic followed by a meta-analysis has been performed. (...) Current data indicates a need for more comparative information between honey bees and non-Apis bees as well as separate pesticide risk assessment procedures for non-Apis bees.

Accès au document

ERA / Publications scientifiques / vers de terre et pesticides

DNA Damage and Effects on Antioxidative Enzymes in Earthworm (*Eisenia fetida*) Induced by Flumorph

Authors: Cao, XY; Yang, C; Liu, JL; Hui, XJ; Yang, W; Li, SS; Tian, YN; Cai, LM

Source: APPLIED BIOCHEMISTRY AND BIOTECHNOLOGY, 172 (4):2276-2285, 10.1007/s12010-013-0662-8 FEB 2014

Abstract: Flumorph is an Oomycete fungicide, which is used extensively as an effective fungicide in vegetables and fruits, but little is known about its effect on nontarget soil organisms. In the present study, biochemical responses including changes in the activity of antioxidative enzymes catalase (CAT), superoxide dismutase (SOD), glutathione-S-transferase (GST), malondialdehyde (MDA), and DNA damage induced by flumorph were investigated in earthworms (Eisenis fetida). (...) The results demonstrate that flumorph induces oxidative stress and DNA damage to earthworms, and the effects may be the important mechanisms of its toxicity.

Accès au document

Comparative and combined acute toxicity of butachlor, imidacloprid and chlorpyrifos on earthworm, *Eisenia fetida*

Authors: Chen, C; Wang, YH; Zhao, XP; Wang, Q; Qian, YZ

Source: CHEMOSPHERE, 100111-115; 10.1016/j.chemosphere.2013.12.023 APR 2014

Abstract: Various pesticides have become widespread contaminants of soils due to their large applications in agriculture and homes. An earthworm assay was used to assess the acute toxicity of butachlor, imidacloprid and chlorpyrifos with different modes of action. Ecotoxicities of these pesticides were compared for earthworm *Eisenia fetida* separately and in combination in artificial soil and contact filter paper tests.(...) The CA model provides estimates of mixture toxicity that did not markedly underestimate the measured toxicity, and therefore the CA model is the most suitable to use in ecological risk assessments of the pesticides.

Accès au document

ERA / Droit et politique de l'environnement

Avis de l'Anses relatif à la modification des annexes de REACH en vue de la prise en compte des nanomatériaux

Avis de l'Anses du 2 Avril 2014 Saisine n° 2013-SA-0127 du 10 juillet 2013 par la Direction générale de la prévention des risques (DGPR) du ministère de l'écologie, du développement durable et de l'énergie.

Accès au document

Allemagne : Pharmaceuticals in the environment pose a global challenge

Ce communiqué de presse du Ministère de l'environnement allemand (Umweltbundesamt) du 09/04/2014 fait le point sur cette question qui est alors l'objet d'un séminaire de 2 jours.

Hundreds of active substances and degradation products contaminate water and soil almost worldwide

A research project on behalf of the Federal Environment Agency has shown the magnitude of the contamination of the environment by pharmaceuticals: traces of more than 630 different pharmaceutical ingredients and their degradation products have been recorded in many regions of the earth. They can be found in water, soil, sludge and organisms. The occurrence of the painkiller and anti-inflammatory drug diclofenac is very high. Its active substance has been found in the waters of 50 different countries. The United Nations Environment Programme (UNEP) is reviewing whether "pharmaceuticals in the environment" should be taken up as a new international field of action in the SAICM international chemicals policy framework.

The Federal Environment Agency (UBA) and the Federal Ministry for the Environment are organising an international pharmaceuticals workshop on 8-9 April 2014 in Geneva in support of the initiative.

…… High concentrations of pharmaceutical residues have been measured not only in the bodies of water of industrialised countries but also in those of many developing and emerging countries. Initial results of the UBA project report that over 630 different pharmaceutical active substances and their degradation products have been traced in the environment worldwide. There are 17 substances which occurred in every region of the world…

Pharmaceuticals in the environment

The primary path to the environment for human drugs is domestic wastewater. The drugs are usually not fully broken down after ingestion and are subsequently excreted. Wastewater treatment plants often do not have the capacity to filter out all pharmaceutical residues. Where wastewater treatment plants are absent these substances have a direct pathway into bodies of water, where they cause harm to plants and animals. Veterinary drugs enter soil and water primarily via the slurry and manure of treated animals. There is little information up to now about the long term effect of these substances on ecosystems, but both laboratory and field experiments have proven such negative effects as reduced growth, behavioural changes or decreased reproductive capacity of organisms in the environment.

Hormones, antiparasitics and certain painkillers have emerged as particularly relevant to the environment since they are ecotoxic in even the smallest concentrations and are also very persistent.

Strategic Approach to International Chemicals Management (SAICM)

SAICM is an international, UN-led policy framework to promote chemical safety around the world. Its objective is, by 2020, for chemicals to be produced and used in ways that minimize significant adverse impacts on human health and the environment.

Research project

"Global Relevance of Pharmaceuticals in the Environment" is a research project by the IWW Water Centre in Mülheim an der Ruhr and adelphi consult GmbH in Berlin on behalf of the Federal Environment Agency…

Accès au document

ERA / Droit : règlementation des pesticides / Débats Articles Questions

Agchem Forum 2014 : 9-10 Septembre 2014 Barcelone

Ce colloque annuel comporte un volet sur **la reglementation des " plant protection products".** Parmi les points abordés, **la reglementation européenne sur l'évaluation des risques.**

The development and implementation of new guidance documents and testing methods for both **human and environmental safety,** including the risk assessment for bees, cumulative risk assessment, operator exposure, good modelling practice, higher plants and non-target arthropods.

Parmi les intervenants :

Recent Developments and Future Plans in the EFSA Assessments of Active Substances and MRL Applications / **Jose Tarazona,** Head of the Pesticides Unit, EFSA

Update of EFSA on Cumulative Risk Assessment / **Luc Mohimont**, Deputy Head of Pesticides at EFSA, European Food Safety Authority

EFSA Scientific Opinion on Relevance of Dissimilar Mode of Action for Cumulative Risk Assessment / **Karen Hirsch-Ernst**, Member of the PPR Panel, On Behalf of EFSA, Germany

On-Going Activities on the Development of Scientific Opinions and Guidance Documents Related to Ecotox and Environmental Fate of Plant Protection Products / **Mark Egsmose**, Senior Scientific Officer, European Food Safety Authority

Détails sur l'atelier 3 consacré à : Environmental Safety - Ecotox and Fate :

Essential feedback from EFSA, 7 Member States and Industry on the development and implementation of new guidance documents for aquatic and terrestrial ecotox and fate

Risk Assessment for Bees: Guidance Documents

Update on the Enforcement of the Bee Guidance Document. Plus discover how the key elements for implementation will be **interpreted by Member States** and advice from **ECPA Pollinator Steering Team** on how industry are developing approaches to conduct risk assessments and addressing data gaps.

Development and Implementation of New Environmental Guidance Documents and Environmental Data Requirements under 1107

Mark Egsmore, EFSA provides and update on the development of **scientific opinions and guidance documents** related to **environmental fate activities** for plant protection products and the timing of ongoing activities.

Non-target terrestrial plants / Non-target terrestrial arthropods / Soil risk assessment / Protected crops / DegT50 values in soil / Amphibians in agricultural landscape and pesticide exposure

Ecological Modelling

Essential feedback on **EFSA Scientific Opinion on Good Modelling Practice for Effect Models for Risk Assessment of Plant Protection Products.** Cutting edge developments in ecological modelling from **Bayer CropScience,** their use for higher tier risk assessments and designing models for compliance to new guidance documents.

NEW FOR 2014: Zonal Authorisation- Environmental Risk Assessment

Hear directly from **Northern** and **Southern Zone Member State representatives** on **environmental risk assessment expectations** and advice for dealing with different climatic and topographic conditions for risk assessment.

Accès au document

ERA / Droit : règlementation des pesticides / Textes officiels français

L'ITSAP-Institut de l'abeille se félicite d'avoir été entendu

Communique de presse de l'Institut technique et scientifique de l'apiculture et de la pollinisation

L'Anses a publié le 28 avril 2014 son avis sur l'utilisation des traitements phytosanitaires avec mention Abeilles : ceux-ci ne devront être appliqués qu'après le coucher du soleil. L'ITSAP-Institut de l'abeille, qui a été auditionné par l'Anses, a présenté un état des connaissances scientifiques aboutissant aux mêmes conclusions. La prise en compte de ces conclusions représente une grande avancée pour la filière apicole, dans la prise en compte des abeilles et pollinisateurs dans l'environnement

Afin d'émettre son avis sur cette question, l'Anses a auditionné l'ITSAP-Institut de l'abeille (Axel DECOURTYE, Directeur scientifique et technique et Cyril VIDAU, Écotoxicologue) le 21 mars dernier pour que l'institut lui restitue de façon synthétique un état des lieux des connaissances sur les principaux facteurs qui déterminent l'activité de butinage des abeilles (mellifères et sauvages) sur les parcelles cultivées.

Traiter au coucher du soleil ou après, pour préserver les abeilles. Une bonne idée ?

Le site http://www.forumphyto.fr présente l'avis de l'ANSES, la position du Ministère et de la DGAL et les réactions de la presse et de la profession.

……Il conviendrait donc que, quelle que soit la culture concernée, les traitements phytopharmaceutiques bénéficiant d'une dérogation, ne puissent être appliqués qu'après l'heure de coucher du soleil telle que définie par l'éphéméride et dans les trois heures suivantes, dans des conditions permettant d'assurer la sécurité et la santé des opérateurs.

L'avis de l'ANSES ne se prononce pas sur les autres pollinisateurs. De plus, l'ANSES avoue ne pas avoir suffisamment de données pour juger d'autres facteurs qui pourraient avoir une importance quant au butinage des pollinisateurs : températures, production d'exsudats, présence de fleurs en bordure de parcelles ou en inter-rang, différences selon les cultures.

L'avis de l'ANSES ne se penche que sur les risques liés à l'application d'insecticides pour les abeilles, sur une base expérimentale. Il ne se penche ni sur les autres risques pour les abeilles, ni sur les problèmes qu'une interdiction de traitement en plein jour poserait.

Un ministère pressé

Stéphane Le Foll, à l'occasion d'un point d'étape du Plan de Développement Durable de l'Apiculture, a annoncé que « l'arrêté interministériel du 28 novembre 2003, sur les produits phytosanitaires bénéficiant de la mention abeilles est en cours de révision ».

La DGAL (Ministère de l'Agriculture) a même précisé : « **Un arrêté interministériel d'interdiction des épandages en journée est en cours de rédaction et doit être publié au Journal officiel d'ici trois à quatre mois** »

La profession adorerait une telle promptitude de l'administration pour résoudre la question des usages orphelins et mettre en place l'harmonisation de la réglementation phytosanitaire prévue par l'Union Européenne…

Les réactions des médias et de la profession

Les médias ont très vite rendu compte de cette annonce. Mais aussi de la réaction des **organisations professionnelles, quelque peu surprises** qu'une telle décision puisse être envisagée sans qu'elles soient consultées.

Accès au document

Avis de l'Anses concernant la révision de l'arrêté du 28 novembre 2003 relatif aux conditions d'utilisation des insecticides et acaricides à usage agricole en vue de mieux protéger les abeilles et autres insectes pollinisateurs

Avis de l'Anses du 31 mars 2014 Saisine n°2013-SA-0234 (du 19 décembre 2013 par la Direction générale de l'alimentation)

Contexte : Le plan de développement durable de l'apiculture (PDDA) prévoit, à son action 2.3, d'« ouvrir une réflexion sur une modification de l'arrêté du 28 novembre 2003 en n'autorisant par dérogation l'utilisation de certains pesticides pendant la période de floraison ou de production d'exsudats que lorsque les abeilles sont absentes et notamment à la nuit tombée (ou lorsque d'autres conditions (température, hygrométrie) sont réalisées). »

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ERA / Documents de reference

EFSA - Modern methodologies for human hazard assessment of chemicals

Scientific Report of EFSA published on 24 April 2014. Publié dans EFSA Journal 2014;12(4) 87 pages.

Le rapport reprend le rapport les concepts de Adverse Outcome Pathway (AOP) et de Intermediate Key Events (IKE) issus des approches en ecotoxicologie p 12

This scientific report provides a review of modern methodologies and tools to depict toxicokinetic and toxicodynamic processes and their application for the human hazard assessment of chemicals. The application of these methods is illustrated with examples drawn from the literature and international efforts in the field. First, the concepts of mode of action/adverse outcome pathway are discussed together with their associated terminology and recent international developments dealing with human hazard assessment of chemicals. Then modern methodologies and tools are presented including in vitro systems, physiologically-based models, in silico tools and OMICs technologies at the level of DNA/RNA (transcriptomics), proteins (proteomics) and the whole metabolome (metabolomics). Future perspectives for the potential applications of these modern methodologies and tools in the context of prioritisation of chemicals, integrated test strategies and the future of risk assessment are discussed. The report concludes with recommendations for future work and research formulated from consultations of EFSA staff, expert Panels and other international organisations……

Regarding the future of chemical risk assessment, exploration of new risk assessment frameworks to bring a systems toxicology perspective to risk assessment using case studies is needed. Weight of evidence and uncertainty analysis methodologies are also essential for the integration of data from new methodologies in the mode of action framework and chemical risk assessment as a whole. Finally, reinforcing collaborations with international institutions is critical for EFSA and highly recommended in order to integrate these new methods and facilitate international harmonisation.

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ERA / Normes et Methodes

EFSA Guidance Document to obtain DegT50 values

Guide paru en Mai 2014 dans EFSA Journal 2014;12(5):3662, 37 pp.

Abstract EFSA was asked by the European Commission to prepare a Guidance of EFSA for evaluating laboratory and field dissipation studies to obtain degradation rate parameters (DegT50matrix values) of active substances of plant protection products and transformation products of these active substances in soil. This EFSA Guidance Document provides guidance for users on how to obtain DegT50matrix values when performing risk assessments according to Regulation EC No 1107/2009 of the European Parliament and the Council. In addition, this document provides guidance on adsorption parameter (Koc) selection and new Crop Interception values.…

A number of Member States expressed interest in a revision of the current SANCO Guidance Document on persistence in soil (EC, 2000) during a general consultation of Member States on Guidance Documents in answer to a request by EFSA sent via the Standing Committee on the Food Chain and Animal Health. Furthermore, the previous Pesticides Risk Assessment Peer Review (PRAPeR) Unit (now Pesticides Unit) noted that the existing SANCO Guidance Document (EC, 2000) needed to be updated.

The Forum for the Co-ordination of pesticide fate models and their Use (FOCUS, 1997) developed the first guidance at EU level for exposure assessment in soil, but this did not include recommendations on how to estimate degradation rate parameters. FOCUS (2006) developed detailed guidance on estimating degradation and dissipation rate parameters from laboratory and field studies, The Plant Protection Products and their Residues (PPR) Panel produced an opinion for evaluating laboratory and field dissipation studies to obtain DegT50matrixmatrix values of plant protection products in soil (EFSA PPR Panel, 2010). This EFSA Guidance Document is based on the EFSA PPR Panel (2010) publication, and when this guidance is noted by the Standing Committee of the Food Chain and Animal Health it will replace EFSA PPR Panel (2010) document as EU guidance.

EFSA considers the current SANCO Guidance Document on persistence in soil (EC, 2000) not appropriate for use in exposure and risk assessment according to Regulation EC No 1107/2009 of the European Parliament and the Council (EC, 2009) as it has been replaced partly by FOCUS (2006) and this EFSA Guidance Document.

The Guidance Document contains guidance on:

-selection of DegT50matrix values from laboratory and field experiments for use in exposure assessment,

-calculation of geomean DegT50matrixmatrix,
-design of field studies for obtaining DegT50matrixmatrix values in soil,
-guidance on the possibility of combining DegT50matrixmatrix values from laboratory studies with DegT50matrixmatrix values obtained from field studies if certain conditions are met,
-use of geomean Kom and Koc,
-use of updated crop interception values,
-worked examples on how to use this guidance.

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EFSA News in brief: L'EFSA présente de nouvelles orientations pour mesurer les taux de dégradation des pesticides dans les sols

8 Mai 2014 L'EFSA a publié un nouveau document d'orientation qui permettra aux scientifiques d'évaluer un aspect spécifique de l'exposition environnementale aux pesticides.

Ce document présente une méthodologie claire pour évaluer les études qui mesurent le temps nécessaire à la dégradation effective de 50 % d'un pesticide chimique et de ses produits de transformation dans le sol. Cette valeur porte le nom de « valeur DegT50 ». De manière importante, elle permet aux utilisateurs d'exclure les effets de la dissipation, un autre processus qui fait disparaître les résidus de pesticides des sols.

Ces orientations sont principalement destinées aux évaluateurs des risques et aux requérants de l'industrie et elles leur permettront de dériver les valeurs DegT50 qui constituent des informations essentielles pour évaluer la sécurité des pesticides. L'EFSA a élaboré le document d'orientation dans le cadre de ses travaux en cours dans le domaine des pesticides pour protéger l'environnement. Cette méthodologie peut également être appliquée à des substances chimiques libérées dans le sol par l'utilisation de substances autres que des pesticides.

En juin 2014, l'EFSA organisera une réunion d'une journée entière avec près de 65 parties prenantes pour expliquer comment utiliser au mieux la méthodologie exposée dans ces orientations. Cet événement, affiche déjà complet.

Accès au document

Norme Afnor NF ISO 16303 Qualité de l'eau - Détermination de la toxicité des sédiments d'eau douce vis-à-vis de *Hyalella azteca*

Nouvelle norme publiée en Janvier 2014

La présente Norme internationale définit une méthode de détermination de la toxicité d'un sédiment entier vis-à-vis de jeunes amphipodes *Hyalella azteca*, fondée sur la survie et l'inhibition de la croissance après 14 jours et/ou 28 jours.

Ecotoxicologie : AFNOR/T95E

Accès au document

Norme Afnor : NF EN ISO 14238 Qualité du sol - Méthodes biologiques - Détermination de la minéralisation de l'azote et de la nitrification dans les sols, et de l'influence des produits chimiques sur ces processus

Cette nouvelle norme est publiée depuis Février 2014.

Ecotoxicologie : AFNOR/T95E

Accès au document

Norme Afnor révisée NF EN ISO 16387

La version révisée est publiée depuis Mars 2014 Qualité du sol - Effets des contaminants sur les Enchytraeidae (*Enchytraeus* sp.) - Détermination des effets sur la survie et la reproduction

La présente Norme internationale spécifie l'une des méthodes permettant d'évaluer la fonction d'habitat des sols et de déterminer les effets des contaminants et des substances du sol sur la reproduction *d'Enchytraeus sp.* par absorption cutanée et ingestion au cours d'un essai chronique. Elle est applicable aux sols et aux matériaux de type sol de qualité inconnue provenant, par exemple, de sites contaminés, de sols amendés, de sols après remédiation, de sols agricoles ou d'autres sites d'intérêt, et de déchets. Les effets des substances sont évalués à l'aide d'un sol standard, de préférence un substrat de sol artificiel défini. Pour les sols contaminés, les effets sont déterminés dans le sol soumis à essai et dans un sol témoin. Selon l'objectif de l'étude, il convient que les substrats témoin et de dilution (gamme de dilutions d'un sol contaminé) soient un sol non contaminé comparable au soumis à essai (sol de référence) ou un sol standard (par exemple, sol artificiel).

Ecotoxicologie : AFNOR/T95E

Accès au document

Norme Afnor révisée : 11267 Qualité du sol - Inhibition de la reproduction de Collembola (*Folsomia candida*) par des contaminants du sol

Une version révisée de la norme est publiées en avril 2014. NF EN ISO 11267

La présente Norme internationale spécifie l'une des méthodes permettant d'évaluer la fonction d'habitat des sols et de déterminer les effets de contaminants du sol et de substances sur la reproduction de *Folsomia candida* Willem par absorption cutanée et ingestion. Cet essai chronique s'applique aux sols et matériaux du sol de qualité inconnue, par exemple provenant de sites contaminés, de sols amendés, de sols après remédiation, de sites industriels, agricoles ou d'autres sites d'intérêt et de déchets. Les effets des substances sont évalués à l'aide d'un sol standard, de préférence un substrat de sol artificiel défini. Pour les sols contaminés, les effets sont déterminés dans le sol soumis à essai et dans un sol témoin. Selon l'objectif de l'étude, il convient que le substrat témoin et de dilution (gamme de dilutions d'un sol contaminé) soit un sol non contaminé comparable au sol à évaluer

(sol de référence) ou un sol standard (par exemple un sol artificiel).

Ecotoxicologie : AFNOR/T95E

Accès au document

Dosage des résidus de néonicotinoïdes dans le nectar par chromatographie en phase liquide couplée à la spectrométrie de masse en tandem (LC-MS/MS)

Article paru dans la revue de l'ANSES Euro references cahier N°11, hiver 2013

Anne-Claire Martel, Patrick Mangoni, Cristina Gastaldi-Thiery Anses, Laboratoire de Sophia-Antipolis (France)

Les nouvelles mesures réglementaires françaises, relatives aux opérations mettant en œuvre les micro-organismes et toxines (MOT), sont en passe de modifier durablement le paysage des laboratoires de microbiologie. Ce nouveau cadre réglementaire vient renforcer le dispositif de contrôle dans ce domaine pour une meilleure sécurité et sûreté biologiques. Il se traduit en pratique par un accroissement des exigences administratives et fonctionnelles qui nécessitent une plus grande vigilance de la part des opérateurs. Pour répondre à ces nouvelles exigences, l'Agence nationale de sécurité sanitaire de l'alimentation, de l'environnement et du travail (Anses) a mis en place en son sein une méthodologie d'évaluation des risques prenant en compte les spécificités de ses laboratoires dans les domaines de la référence et de la recherche.

Accès au document

Dispositifs expérimentaux et plateformes

Green News Techno : Innovation dans les biocapteurs pour les pesticides

En fin d'année, des chercheurs brésiliens de l'institut national d'électronique organique (Ineo) ont annoncé la mise au point d'un capteur biologique (biocapteur) pouvant détecter en quelques minutes un pesticide hautement toxique dans l'eau, les sols ou les aliments. Ciblé sur le méthamidophos, interdit depuis 2012 au Brésil comme il l'est en Europe (mais encore utilisé dans certaines cultures au Brésil) , **ce biocapteur ouvre aussi des perspectives pour le suivi d'autres pesticides dont le mode d'action est le même, notamment les carbamates et d'autres organophosphorés**.

Développé pour répondre à la problématique du suivi rapide du méthamidophos, un pesticide hautement toxique qui agit sur les systèmes neurologiques, immunitaires, reproducteurs et endocriniens, le nouveau biocapteur s'appuie justement sur le mode d'action du composé pour le détecter. Plus précisément, cette molécule pesticide agit sur le système nerveux des êtres vivants en inhibant l'action de l'acétylcholinestérase, une enzyme qui intervient dans le bon fonctionnement des liaisons synaptiques. L'idée a donc été d'utiliser cette enzyme pour détecter la présence du pesticide dans un échantillon. Concrètement, les chercheurs ont créé un capteur qui va mesurer le pH (donc mesurer les protons H+), ce capteur étant formé d'une lame de verre constituée d'une série de couches de silice nanométriques dans lesquelles l'enzyme a été introduite. Ensuite, en présence du pesticide, l'enzyme est inhibée, entraînant une diminution de la production de protons par l'acétylcholinestérase. C'est cette différence de production de protons, proportionnelle à la concentration en pesticides, qui permet de définir la concentration en méthamidophos. Pour la lecture du capteur, un appareil, assez similaire à un glucomètre, a été développé spécifiquement.

Pour d'autres pesticides de type carbamates ou d'autres organophosphorés (famille dont fait partie le méthamidophos) qui agissent également par inhibition de l'enzyme acétylcholinestérase, le nouveau biocapteur pourrait être aussi utilisé…

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Accès au document

ANSES : Mortalité des colonies d'abeilles : présentation des premiers résultats du programme de surveillance européen EPILOBEE

Publié le 08/04/2014

For several years now, weakening and mortality of bee colonies has been observed in many countries. Because of this, for the first time an active surveillance study of bee colony mortality known as EPILOBEE has been implemented in 17 European Member States.

In order to harmonise surveillance procedures, each Member State has devised a surveillance protocol based on the guidelines issued by ANSES's Sophia-Antipolis laboratory, which is the European Reference Laboratory (EURL) for bee health.

This wide-scale study has provided a large amount of data which now makes it possible to estimate mortality rate variability from one geographical area to another in Europe. In addition, an analysis of these data in the future will make it possible to more effectively identify the links between bee colony mortality and certain risk factors (diseases, use of veterinary treatments, etc.). EPILOBEE has made it possible to implement harmonised bee colony surveillance methods which can be used routinely in the future.

Results and outlook

...103 930 laboratory analyses have been stored in a data base and will be analysed in the near future.

These analyses will make it possible to explore the statistical links between bee colony mortality and certain risk factors, including disease prevalence, the use of veterinary treatments, the beekeeping context and other parameters extrinsic to colonies such as diet, season, migration, etc.

Accès au document

Publications des membres du réseau ecotox

An overview of existing raptor contaminant monitoring activities in Europe

Author(s): Gomez-Ramirez, P.; Shore, R. F.; Brink, N. W. van den; Hattum, B. van; Bustnes, J. O.; Duke, G.; Fritsch, C.; Garcia-Fernandez, A. J.; Helander, B. O.; Jaspers, V.; Krone, O.; Martinez-Lopez, E.; Mateo, R.; Movalli, P.; Sonne, C.

Source: Environment International, 67 12-21; 2014

Abstract: Biomonitoring using raptors as sentinels can provide early warning of the potential impacts of contaminants on humans and the environment and also a means of tracking the success of associated mitigation measures. Examples include detection of heavy metal-induced immune system impairment, PCB-induced altered reproductive impacts, and toxicity associated with lead in shot game. Authorisation of such releases and implementation of mitigation is now increasingly delivered through EU-wide directives but there is little established pan-European monitoring to quantify outcomes. We investigated the potential for EU-wide coordinated contaminant monitoring using raptors as sentinels. We did this using a questionnaire to ascertain the current scale of national activity across 44 European countries. According to this survey, there have been 52 different contaminant monitoring schemes with raptors over the last 50 years. There were active schemes in 15 (predominantly western European) countries and 23 schemes have been running for >20 years; most monitoring was conducted for >5 years. Legacy persistent organic compounds (specifically organochlorine insecticides and PCBs), and metals/metalloids were monitored in most of the 15 countries. Fungicides, flame retardants and anticoagulant rodenticides were also relatively frequently monitored (each in at least 6 countries). Common buzzard (*Buteo buteo*), common kestrel (*Falco tinnunculus*), golden eagle (*Aquila chrysaetos*), white-tailed sea eagle (Haliaeetus albicilla), peregrine falcon (*Falco peregrinus*), tawny owl *(Strix aluco*) and barn owl (*Tyto alba*) were most commonly monitored (each in 6-10 countries). Feathers and eggs were most widely analysed although many schemes also analysed body tissues. Our study reveals an existing capability across multiple European countries for contaminant monitoring using raptors. However, coordination between existing schemes and expansion of monitoring into Eastern Europe is needed. This would enable assessment of the appropriateness of the EU-regulation of substances that are hazardous to humans and the environment, the effectiveness of EU level mitigation policies, and identify pan-European spatial and temporal trends in current and emerging contaminants of concern.

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DOI: 10.1016/j.envint.2014.02.004

Accès au document

Establishment of bioenergy crops on metal contaminated soils stimulates belowground fauna

Author(s): Chauvat, M.; Perez, G.; Hedde, M.; Lamy, I.

Source: Biomass and Bioenergy, 62 207-211; 2014

Abstract: Soils of contaminated agrosystems represent potential arable land surfaces for the production of non-alimentary crops. The aim of this study is to monitor changes in belowground biodiversity (Collembola), potentially occurring following establishment of perennial biomass crop systems on contaminated agricultural land. We selected, within an agricultural trial, two different biomass crops, miscanthus (*Miscanthus giganteus*) and switchgrass (*Panicum virgatum*) and an annual wheat crop (*Triticum sp.*) used as a control. About 20-fold more individuals were found under miscanthus and switchgrass than under wheat. The highest mean number of species was found under miscanthus being 30% greater than in switchgrass and 424% than in annual wheat. Furthermore, abundance and species richness of the three collembolan life-forms (epedaphic, hemiedaphic, and euedaphic) differed between the crops leading to distinctly different assemblages. On metal contaminated soils, perennial bioenergy crops have the potential to increase belowground faunal diversity and abundance with the identity of crops as a critical factor driving soil animal assemblages.

DOI: 10.1016/j.biombioe.2014.01.042

Accès au document

Analyses of soil cadmium and copper contents on a Domerien soil series of Burgundy in France.

Author(s): Bermond, A.; Baize, D.; Mench, M.; Kim, S. A.

Source: African Journal of Biotechnology, 13 (12):1343-1350; 2014

Abstract: The aim of this study is to determine the availability of cadmium (Cd) in the soil of Yonne district, Burgundy, France. Soil samples were collected from surface-ploughed layer in fields

across the southern part of the Yonne district, Burgundy, France. Some results analysing soil Cd and Cu contents on Domerien region of Burgundy has been presented. This is to know the relationship between extracting time and extracted Cd and Cu contents from the two sites' soils (Dubloc, Bierry) in the Domerien soil series. A total of 68-107% Cd and 20-28% Cu were extracted from the soil in 1440 min. The two soils were acidic, and around 70% of Cd contents were extracted in 20 min of extraction, while around 65% of Cu contents were extracted in 30 min of extraction. The Cd extraction was blocked at the mid-extraction time, while the Cu extraction kept on increasing up to the end of the extraction time. Cadmium extraction increased with increase in pH value in the present experiment. Copper content shows same tendency with Cd. **E-mail Addresses:** kimsd@joongbu.ac.kr

Accès au document

Low impact of phenanthrene dissipation on the bacterial community in grassland soil

Author(s): Niepceron, M.; Beguet, J.; Portet-Koltalo, F.; Martin-Laurent, F.; Quillet, L.; Bodilis, J.

Source: Environmental Science and Pollution Research, 21 (4):2977-2987; 2014

Abstract: The effect of phenanthrene on the bacterial community was studied on permanent grassland soil historically presenting low contamination (i.e. less than 1 mg kg -1) by polycyclic aromatic hydrocarbons (PAHs). Microcosms of soil were spiked with phenanthrene at 300 mg kg -1. After 30 days of incubation, the phenanthrene concentration decreased rapidly until its total dissipation within 90 days. During this incubation period, significant changes of the total bacterial community diversity were observed, as assessed by automated-ribosomal intergenic spacer analysis fingerprinting. In order to get a deeper view of the effect of phenanthrene on the bacterial community, the abundances of ten phyla and classes (Actinobacteria, Acidobacteria, Bacteroidetes, Alphaproteobacteria, Betaproteobacteria, Gammaproteobacteria, Firmicutes, Verrucomicrobiales, Gemmatimonadetes, and Planctomycetes) were monitored by quantitative polymerase chain reaction performed on soil DNA extracts. Interestingly, abundances of some bacterial taxa significantly changed as compared with controls. Moreover, among these bacterial groups impacted by phenanthrene spiking, some of them presented the potential of phenanthrene degradation, as assessed by PAH-ring hydroxylating dioxygenase (PAH-RHD alpha) gene detection. However, neither the abundance nor the diversity of the PAH-RHD alpha genes was significantly impacted by phenanthrene spiking, highlighting the low impact of this organic contaminant on the functional bacterial diversities in grassland soil.

DOI: 10.1007/s11356-013-2258-9

Accès au document

A new method to measure allyl isothiocyanate (AITC) concentrations in mustard: comparison of AITC and commercial mustard solutions as earthworm extractants

Author(s): Céline Pelosi, François Chiron, Florence Dubs, Mickaël Hedde, Jean-François Ponge, Sandrine Salmon, Daniel Cluzeau, Sylvie Nélieu

Applied Soil Ecology 80, August (2014) 1-5. Accessible en ligne sur HAL

Earthworms are target organisms both for scientists studying the biological component of soils and for farmers concerned with monitoring the quality of their soils. Different expellants are used to extract earthworms from the soil but differences in chemical properties and efficiency between commercial mustard and allyl isothiocyanate (AITC) solutions remain unknown. The objectives of this study were to compare (i) the concentration of irritating product (allyl isothiocyanate AITC) in two expellant solutions (diluted mustard or AITC solution) and (ii) their efficiency in extracting earthworms from the soil. AITC concentration was analyzed according to a new method, based on AITC solvent extraction and HPLC quantification, in one commercial mustard brand to assess its variability within and between batches of jars. According to mustard spiking with AITC standard solution, extraction recovery was estimated as 98 ± 2%. Earthworm field data were collected in spring 2012 in 22 cultivated fields located in east Île-de-France, comparing pure AITC to commercial mustard solutions. Species diversity, abundance and biomass of earthworms per plot were measured. We showed that AITC concentration in commercial mustard varied according to the use by date but not according to the batch. We thus recommend using the freshest mustard available from the same batch. Moreover, AITC solution was found to be about four times more concentrated in AITC than the commercial mustard solution. Despite this result, no significant differences were found in the efficiency of commercial mustard or AITC solutions to bring earthworms to the soil surface in terms of abundance, biomass or diversity. We thus discuss the advantage and drawbacks of using both expellants in the field.

http://dx.doi.org/10.1016/j.apsoil.2014.03.005

Accès au document

Modelling the impacts of maize decomposition on glyphosate dynamics in mulch

Author(s): Aslam, S.; Benoit, P.; Chabauty, F.; Bergheaud, V.; Geng, C.; Vieuble-Gonod, L.; Garnier, P.

Source: European Journal of Soil Science, 65 (2):231-247; 2014

Abstract: The retention of crop residues as mulch on the soil surface in conservation agriculture systems greatly influences the fate of pesticides, as most of the applied pesticide is intercepted by mulch before moving to the soil. This work was conducted in order to model the effect of maize decomposition on glyphosate degradation in mulch and soil. Labelled 14C-glyphosate degradation was monitored for 49 days in three treatments with the same soils but with maize residues at different stages of decomposition (0, 20 and 49 days). Fresh residues of maize (0 days) exhibited an evolution of their biochemical fractions to a greater extent than decomposed residues. Glyphosate mineralization was faster in the 0-day treatment in mulch residues and in the soil layer below the mulch. However, a greater formation of non-extractable residues (NERs) was observed in mulch residues and soils in the 20- and 49-day treatments than in the 0-day treatment. Modelling maize mulch decomposition with the COP-soil model indicated that microbial activity was different in the three treatments and depended on the initial composition of maize residues. Glyphosate mineralization in mulch and soil can be simulated with an assumption of co-metabolism by coupling the modules of pesticide degradation and mulch carbon decomposition. Glyphosate and its metabolites, including soluble and adsorbed fractions, were simulated with the same adsorption coefficients for all treatments. The simulation of NER formation, however, suggested that more than one microbial population may be involved in the degradation process and could be added in the future development of the model.

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DOI: 10.1111/ejss.12126

Accès au document

Secondary production of freshwater zooplankton communities exposed to a fungicide and to a petroleum distillate in outdoor pond mesocosms

Author(s): Bayona, Yannick; Roucaute, Ana; Roucaute, Marc; Gorzerino, Caroline; Cailleaud, Kevin; Lagadic, Laurent; Basseres, Anne; Caquet, Thierry

Source: Environmental toxicology and chemistry / SETAC, 33 (4):836-46; 2014-Apr

Abstract: Ecological risk assessment of chemicals in mesocosms requires measurement of a large number of parameters at the community level. Studies on invertebrate communities usually focus on taxonomic approaches, which only provide insights into taxonomic structure changes induced by chemicals. In the present study, abundance, biomass (B), theoretical production (P), and instantaneous P/B ratio were used as endpoints to assess the effects of the commercial form of the dithiocarbamate fungicide thiram (35g/L and 170g/L nominal concentrations) and of the hydrocarbon water accommodated fraction (HWAF) of a petroleum distillate (0.01mg/L, 0.4mg/L, 2mg/L, and 20mg/L loadings) on the zooplankton community in freshwater pond mesocosms. Endpoints were measured during a 4-wk treatment period (1pulse/wk) followed by a 5-mo posttreatment period to evaluate zooplankton population recovery. The chlorophyll a concentration in water was significantly increased after treatment with HWAF, whereas it! was not affected by thiram treatment. Zooplankton abundance-based analysis showed effects on a limited number of taxa, whereas other endpoints (mainly the P/B ratio) revealed that more taxa were impacted, with recovery depending on the chemical and concentration. Exposure to HWAF mainly had a negative impact on cladocerans, which resulted in top-down effects (between cladocerans and phytoplankton). Thiram negatively affected rotifers and copepods, suggesting more direct toxic effects. The results show that the use of secondary production as an endpoint provides a more comprehensive assessment of potential direct and indirect effects of chemicals on a community, and they also support evidence of alteration in functional processes.

DOI: 10.1002/etc.2495

Accès au document

Characterization of chlordecone-tolerant fungal populations isolated from long-term polluted tropical volcanic soil in the French West Indies

Author(s): Merlin, Chloe; Devers, Marion; Crouzet, Olivier; Heraud, Cecile; Steinberg, Christian; Mougin, Christian; Martin-Laurent, Fabrice

Source: Environmental science and pollution research international, 21 (7):4914-27; 2014

Abstract: The insecticide chlordecone is a contaminant found in most of the banana plantations in the French West Indies. This study aims to search for fungal populations able to grow on it. An Andosol heavily contaminated with chlordecone, perfused for 1year in a soil-charcoal system, was used to conduct enrichment cultures. A total of 103 fungal strains able to grow on chlordecone-mineral salt medium were isolated, purified, and deposited in the

MIAE collection (Microorganismes d'Interet Agro-Environnemental, UMR Agroecologie, Institut National de la Recherche Agronomique, Dijon, France). Internal transcribed spacer sequencing revealed that all isolated strains belonged to the Ascomycota phylum and gathered in 11 genera: *Metacordyceps, Cordyceps, Pochonia, Acremonium, Fusarium, Paecilomyces, Ophiocordyceps, Purpureocillium, Bionectria, Penicillium,* and *Aspergillus*. Among predominant species, only one isolate, *Fusarium oxysporum* MIAE01197, was able to grow in a liquid culture medium that contained chlordecone as sole carbon source. Chlordecone increased *F. oxysporum* MIAE01197 growth rate, attesting for its tolerance to this organochlorine. Moreover, *F. oxysporum* MIAE01197 exhibited a higher EC50 value than the reference strain *F. oxysporum* MIAE00047. This further suggests its adaptation to chlordecone tolerance up to 29.2mgl(-1). Gas chromatography-mass spectrometry (GC-MS) analysis revealed that 40% of chlordecone was dissipated in F. oxysporum MIAE01197 suspension culture. No chlordecone metabolite was detected by GC-MS. However, weak amount of (14)CO2 evolved from (14)C10-chlordecone and (14)C10-metabolites were observed. Sorption of (14)C10-chlordecone onto fungal biomass followed a linear relationship (r (2)=0.99) suggesting that it may also account for chlordecone dissipation in *F. oxysporum* MIAE01197 culture.

DOI: 10.1007/s11356-013-1971-8

Accès au document

Low doses of gamma-irradiation induce an early bystander effect in zebrafish cells which is sufficient to radioprotect cell.

Author(s): Pereira, Sandrine; Malard, Veronique; Ravanat, Jean-Luc; Davin, Anne-Helene; Armengaud, Jean; Foray, Nicolas; Adam-Guillermin, Christelle

Source: PloS one, 9 (3):e92974; 2014

Abstract: The term "bystander effect" is used to describe an effect in which cells that have not been exposed to radiation are affected by irradiated cells though various intracellular signaling mechanisms. In this study we analyzed the kinetics and mechanisms of bystander effect and radioadaptation in embryonic zebrafish cells (ZF4) exposed to chronic low dose of gamma rays. ZF4 cells were irradiated for 4 hours with total doses of gamma irradiation ranging from 0.01-0.1 Gy. In two experimental conditions, the transfer of irradiated cells or culture medium from irradiated cells results in the occurrence of DNA double strand breaks in non-irradiated cells (assessed by the number of gamma-H2AX foci) that are repaired at 24 hours post-irradiation whatever the dose. At low total irradiation doses the bystander effect observed does not affect DNA repair mechanisms in targeted and bystander cells. An increase in global methylation of ZF4 cells was observed in irradiated cells and bystander cells compared to control cells. We observed that pre-irradiated cells which are then irradiated for a second time with the same doses contained significantly less gamma-H2AX foci than in 24 h gamma-irradiated control cells. We also showed that bystander cells that have been in contact with the pre-irradiated cells and then irradiated alone present less gamma-H2AX foci compared to the control cells. This radioadaptation effect is significantly more pronounced at the highest doses. To determine the factors involved in the early events of the bystander effect, we performed an extensive comparative proteomic study of the ZF4 secretomes upon irradiation. In the experimental conditions assayed here, we showed that the early events of bystander effect are probably not due to the secretion of specific proteins neither the oxidation of these secreted proteins. These results suggest that early bystander effect may be due probably to a combination of multiple factors.

DOI: 10.1371/journal.pone.0092974

Accès au document

Crop-emptying rate and the design of pesticide risk assessment schemes in the honey bee and wild bees (Hymenoptera: Apidae)

Author(s): Fournier, Alice; Rollin, Orianne; Le Feon, Violette; Decourtye, Axel; Henry, Mickael

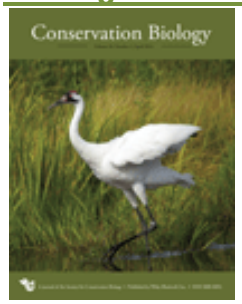
Source: Journal of economic entomology, 107 (1):38-46; 2014-Feb

Abstract: Recent scientific literature and reports from official sanitary agencies have pointed out the deficiency of current pesticide risk assessment processes regarding sublethal effects on pollinators. Sublethal effects include troubles in learning performance, orientation skills, or mobility, with possible contribution to substantial dysfunction at population scale. However, the study of sublethal effects is currently limited by considerable knowledge gaps, particularly for the numerous pollinators other than the honey bee *Apis mellifera* L. the traditional model for pesticide risk assessment in pollinators. Here, we propose to use the crop-emptying time as a rule of thumb to guide the design of oral exposure experiments in the honey bee and wild bees. The administration of contaminated sucrose solutions is typically followed by a fasting time lapse to allow complete assimilation before the behavioral tests. The fasting duration should at least encompass the crop-emptying time, because no absorption takes place in the crop. We assessed crop-emptying rate in fasted bees and how it relates 1) with sucrose solution concentration in the honey bee and 2) with body mass in wild bees. Fasting duration required for complete crop emptying in honey bees fed 20 microl of a 50% sucrose solution was nearly 2 h. Actual fasting durations are usually shorter in toxicological studies, suggesting incomplete crop emptying, and therefore partial assimilation of experimental solutions that could imply underestimation of sublethal effects. We also found faster crop-emptying rates in large wild bees compared with smaller wild bees, and suggest operative rules to adapt sublethal assessment schemes accordingly.

DOI: http://dx.doi.org/10.1603/EC13087

Accès au document

Unintentional wildlife poisoning and proposals for sustainable management of rodents



Author(s): Coeurdassier, Michael; Riols, Romain; Decors, Anouk; Mionnet, Aymeric; David, Fabienne; Quintaine, Thomas; Truchetet, Denis; Scheifler, Renaud; Giraudoux, Patrick

Source: Conservation biology: the journal of the Society for Conservation Biology, 28 (2):315-21; 2014-Apr

Abstract: In Europe, bromadiolone, an anticoagulant rodenticide authorized for plant protection, may be applied intensively in fields to control rodents. The high level of poisoning of wildlife that follows such treatments over large areas has been frequently reported. In France, bromadiolone has been used to control water voles (*Arvicola terrestris*) since the 1980s. Both regulation and practices of rodent control have evolved during the last 15 years to restrict the quantity of poisoned bait used by farmers. This has led to a drastic reduction of the number of cases of poisoned wildlife reported by the French surveillance network SAGIR. During the autumn and winter 2011, favorable weather conditions and high vole densities led to the staging of several hundreds of Red Kites (*Milvus milvus*) in the Puy-de-Dome department (central France). At the same time, intensive treatments with bromadiolone were performed in this area. Although no misuse has been mentioned by the authorities follow! ing controls, 28 Red Kites and 16 Common Buzzards (*Buteo buteo*) were found dead during surveys in November and December 2011. For all these birds, poisoning by bromadiolone as the main cause of death was either confirmed or highly suspected. Other observations suggest a possible impact of bromadiolone on the breeding population of Red Kites in this area during the spring 2011. French regulation of vole control for plant protection is currently under revision, and we believe this event calls for more sustainable management of rodent outbreaks. Based on large-scale experiments undertaken in eastern France, we propose that direct control of voles at low density (with trapping or limited chemical treatments) and mechanical destruction of vole tunnels, mole control, landscape management, and predator fostering be included in future regulation because such practices could help resolve conservation and agricultural issues.

DOI: 10.1111/cobi.12230

Accès au document

Contrasting effects of pyoverdine on the phytoextraction of Cu and Cd in a calcareous soil

Author(s): **Cornu, JY**; Elhabiri, M; Ferret, C; Geoffroy, V A; Jezequel, K; Leva, Y; Lollier, M; Schalk, I J; Lebeau, T

Source: Chemosphere, 103 212-9; 2014-May

Abstract: Enhanced metal phytoextraction by the use of siderophore-producing bacteria (SPB) has received a lot of attention in the past decade. Bacterial siderophores are able to bind a wide range of metals other than iron and thus should enhance their phytoavailability in contaminated matrices. However, the impact of bacterial siderophores in the soil-plant transfer of metals is not yet fully elucidated, as underlined by the opposing results reported in the literature regarding the efficiency of coupling phytoextraction with bioaugmentation by SPB. The present study focuses on one bacterial siderophore, the pyoverdine (Pvd), produced by Pseudomonas aeruginosa. The coordination properties of Pvd towards Cd(II) and Cu(II) were determined and the effect of Pvd supply was assessed on (i) the mobility (CaCl2 extractions), (ii) the phytoavailability (DGT measurements) and (iii) the phytoextraction of Cd and Cu, in a calcareous soil. The stability constant of Pvd-Cu (K(L'Cu)=10(20.1)) was found much higher than that of Pvd-Cd (K(L'Cd)=10(8.2)). The major finding was the agreement observed between Pvd coordination properties and Pvd impact on metals phytoextraction. Pyoverdine, supplied at 250mumolkg(-1) soil, enhanced the mobility, the phytoavailability and the phytoextraction of Cu while the fate of Cd was not affected. All these results were compared to those reported for chelate-assisted phytoextraction. Their relevance in using SPB for phytoremediation is discussed.

DOI: 10.1016/j.chemosphere.2013.11.070

Accès au document

Vie du réseau Ecotox

ANSES : poste à pourvoir

30/04/2014 Coordinateur dans le cadre de la Réglementation REACH (H/F) Entité recruteuse : Direction des Produits Règlementés, Unité REACH-CLP

Information diffusée par C Mougin via la liste mail Ecotox

Appel à propositions : Sujet de thèse de doctorat à soumettre au Conseil de l'école doctorale 227 en vue de leur présentation au concours de juillet 2014

Information diffusée par C Mougin par mail Ecotox le 03/05 : Offre de thèse au sein de l'UMR iEES Paris (Institut d'Ecologie et Sciences Environnementales), encadrée par Emma Rochelle-Newall et Julie Leloup.

Intitulé du sujet de thèse: Co-evolution of dissolved organic matter and bacterial functional and genetic diversity in a newly colonized freshwater aquatic system/ Co-évolution de la matière organique et de la diversité bactérienne phylogénétique et fonctionnelle lors de la colonisation d'un écosystème aquatique artificiel.

Dans le cadre d'une NOEMI (mutation interne) un poste D'IE est ouvert dans l'UMR5557

Information diffusée par mail au réseau Ecotox le 17/04/2014

Responsable : Prof. Gilles COMTE (gilles.comte@univ-lyon1.fr)

Unité d'accueil : UMR5557 http://ecologiemicrobiennelyon.fr

Emploi-type : ingénieur en techniques biologiques

Fonction : ingénieur en techniques biologiques

Mission : 'ingénieur d'études sera affecté à l'équipe Rhizosphère ainsi qu'à la plateforme « centre d'étude des substances naturelles » (CESN) de l'UMR. A ce titre, il/elle assurera la responsabilité technique d'un parc instrumental et participera au montage et à la réalisation de projets de recherche ou partenariat internes/ externes et académiques ou industriels.

Colloques

Acte de colloque : EFSA's 19th Scientific Colloquium on Biodiversity as protection goal in environmental...

Les actes de ce colloque (27 – 28 November 2013, Parma, Italy) sont réunis dans un rapport de 72 pages.

Sommaire :

Accès au document

Joint BES and SFE 2014 Annual Meeting, décembre 2014

La British Ecological Society et la Société Française d'Ecologie organisent un colloque conjoint qui réunira pour la première fois les écologues de nos deux pays. L'objectif du colloque sera de promouvoir échanges et débats sur les principales avancées de l'écologie scientifique, et de renforcer la coopération entre les chercheurs français et britanniques de demain -

- **Agro-ecology and the CAP**
- **Biodiversity and ecosystem services**
- **Evolutionary ecology and disease**
- **Marine ecology and the EU Marine Directive**
- **Freshwater ecology and the EU Water Directive**
- **Horizon 2020 Tackling Societal Challenges**

Accès au document

6ème journée scientifique du Réseau de Recherche VASI, 16/05/2014

A noter, deux présentations sur les pesticides :

Pesticides, sols et protection des plantes

9h45 - 10h05 : Impact des pesticides sur les activités biologiques des sols agricoles (Wassila RIAH-ANGLET, AGRI'TERR - Esitpa)

10h05 - 10h35 : Protection des plantes et plan Ecophyto 2018 (Rémi LAURENT et Henri-Jean POLET, Chambre Régionale d'Agriculture de Normandie)

Accès au document

Actes du workshop: Pharmaceuticals in Soil, Sludge and Slurry

Les présentations à ce séminaire sont maintenant consultables en ligne.

Entry, occurrence, behavior and effects of pharmaceuticals in the environment

Crop irrigation with treated wastewater: Uptake of pharmaceuticals by crops, fate and processes in arable soils (Presentation)

Fate of pharmaceutical residues in sewage sludge and proposal of indicator substances for monitoring (Presentation)

Structural diversity of soil microorganisms as a sensitive indicator of adverse effects from pharmaceutical antibiotics (Presentation)

Biotransformation of ibuprofen in soil (Presentation)

Characterizations of nonextractable residues for their risk assessment in soil with special regard to pharmaceuticals (Presentation)

Antibiotic resistance in the environment (Presentation)

Mixtures of veterinary medicinal compounds in manured soils (Presentation)

Accès au document

Workshop Pharmaceuticals in the Environment, 8-9/04/2014

Les présentations à ce séminaire sont consultables en ligne, dont 2 présentations sur les effets sur l'environnement:

Veterinary NSAIDs and the decline of South Asian vultures

Prof. Rhys E. Green, University of Cambridge, United Kingdom

The birth control pill in municipal wastewaters: is it effective contraception for fishes?

Prof. Karen Kidd, University New Brunswick, Canada

Accès au document

Colloque IALE : les 7èmes Journées françaises de l'Ecologie du Paysage, 27-30 octobre 2014

Les 7èmes Journées françaises de l'Ecologie du Paysage auront lieu à Dijon du 27 au 30 octobre 2014 sur le thème : paysage, territoire et agroécologie : des processus à la concertation entre acteurs.

L'agroécologie interroge sur les liens entre biodiversité et fonctionnements écologiques des agroécosystèmes avec pour enjeu la gestion aux échelles larges des ravageurs des cultures, des maladies, des résistances variétales, la valorisation des régulations biologiques ou encore la pollinisation. Ceci nécessite de comprendre le « paysage des pratiques agricoles », le rôle des habitats semi-naturels et des trames verte et bleue, les interactions entre activités agricoles et faune sauvage ; mais aussi les impacts des activités agricoles en termes de flux de contaminants et d'impact sur la qualité de l'eau au sein des bassins versants.

Fin de soumission de résumés : 31 juillet 2014.

Soumissions et inscriptions https://colloque.inra.fr/iale2014

Perte de biodiversité et vulnérabilité sanitaire des systèmes de production ANSES, 26/06/2014

Ce colloque exploratoire vise à faire le point des éléments de diagnostic qui mettent en évidence des liens avérés ou possibles entre la diminution de la biodiversité agricole et la sécurité sanitaire des systèmes de production, voire de l'ensemble du système alimentaire. Il vise également à comprendre quels sont les déterminants de cette réduction de la biodiversité agricole, et à identifier quels pourraient être les leviers d'actions pour une re-diversification, et dans quelle mesure ils sont compatibles avec ou peuvent s'appuyer sur la recherche d'une meilleure sécurité sanitaire du système alimentaire.

Accès au document

Agchem Forum 2014, 9-10/09/2014

Ce colloque annuel comporte un volet sur la règlementation des "plant protection products". Parmi les points abordés, la règlementation européenne sur l'évaluation des risques.

Accès au document

Ouvrages / rapports

Biomarkers in Toxicology

Publié en Mars 2014 par Elsevier. Edité par : Ramesh C. Gupta. 1154 Pages

Le sommaire détaillé est consultable via Science Direct. Certains chapitres peuvent être acquis à l'unité…dont :

Part III: Agents Toxicity Biomarkers

Chapter 23 – Insecticides Chapter 24 - Herbicides and fungicides

Accès au document

Soil protection critical for Europe's economy and ecosystems — European Environment Agency

Soil is one of the planet's invaluable resources but continues to be degraded in Europe. Together, the mineral particles, water, air, organic matter, and living organisms that constitute soil perform key functions which underpin our society.

Soil is a vital, non-renewable resource for ecosystems, playing an essential role in services such as water purification and food production. It is also a major global carbon sink, with significant potential to remove climate-changing gases from the atmosphere.

The European Environment Agency (EEA) has joined forces with the European Commission's Joint Research Centre on 'The state of soil in Europe', a comprehensive scientific report highlighting the need to protect and maintain soil in a co-ordinated way across the European Union. The report warns that failure to tackle increased soil degradation could eventually compromise food production. Moreover, degraded soil is less able to prevent droughts and flooding and stop biodiversity loss.

The EEA reported in its last flagship report that Europe's soils are subject to erosion and landslides. Organic matter and biodiversity are both declining in some areas, while compaction, salinisation, and contamination are also significant issues. All these problems have considerable economic and environmental consequences. For example, soil erosion by water affects around 16% of Europe's land area. It is largely the result of poor land management, such as deforestation, overgrazing, construction activities and forest fires.

Accès au document

Pesticides et auxiliaires Astredhor (édition papier)

Horticulture : Ce guide pratique destiné à tous ceux qui souhaitent s'engager dans une démarche de biocontrôle en privilégiant l'action régulatrice des macro-organismes est publié par l'Astredhor (institut technique de l'horticulture).

218 pages et 107 fiches

Accès au document

En Bref : associations

CIEL: European NGOs position paper on the Regulation of nanomaterials, April 2014

Auteurs de ce communiqué paru en Avril 2014 : ClientEarth, The European Environmental Bureau, European citizen's Organization for Standardisation, The European consumer voice in Standardisation -ANEC, and Health Care Without Harm, Bureau of European Consumers

Extrait : ..... The European Commission's 2012 Second Regulatory Review on Nanomaterials considers that, as with other substances, some could be hazardous, whilst others may be safe. Therefore, as for every other chemical substance placed on the EU market, nanomaterials need to undergo a thorough risk assessment, including an assessment of the potential risks deriving from their novel properties. Current EU legislation does not guarantee that all nanomaterials on the market are safe by being assessed separately from the bulk form of the substance. Therefore, we ask the European Commission to come forward with concrete proposals for a comprehensive revision of the existing legal framework addressing the potential risks of nanomaterials.

Accès au document

En Bref : focus

ANSES : Avis et rapport de l'Anses relatif à « la réalisation d'une analyse de risque phytosanitaire express portant sur *Halyomorpha halys* (la punaise diabolique) »

Ce rapport d'expertise collective (auquel ont contribué de nombreux chercheurs de l'INRA) concerne une nouvelle **espèce invasive** : *Halyomorpha halys*, un insecte polyphage d'origine asiatique. En France, cet organisme nuisible a été identifié pour la première fois le 02 avril 2013 par le laboratoire d'entomologie de l'Anses de Montpellier

Extrait de l'avis : *H. halys* est déjà présent en France, en Alsace et dans plusieurs pays limitrophes (Suisse et Italie)...Par dispersion naturelle, avec ou sans l'assistance de l'homme, cet insecte parviendra à coloniser l'ensemble de la zone de l'ARP...

Mesures phytosanitaires

Á l'issue de l'analyse du risque, le CES « Risque Biologique pour la Santé des Végétaux » a conclu que le risque potentiel concernant l'invasion *d'H. halys* dans la zone de l'ARP était élevé.

Parallèlement, les mesures de gestion susceptibles de rendre ce risque acceptable ont été examinées. Il existe très peu de mesures de gestion disponibles, efficaces et dont la mise en place soit envisageable pour contrôler l'invasion *d'H. halys* en France....

Toutefois, des mesures pourraient réduire les impacts de l'invasion ….

Une coordination européenne des programmes de recherche permettrait un gain d'efficacité…

Accès au document

En Bref : presse

Soil contamination widespread in Europe — European Environment Agency

There are an estimated 340 000 contaminated pieces of land in Europe, most of which are yet to be identified, according to a new Europe-wide assessment. Managing contaminated land in Europe costs an estimated € 6.5 billion per year. Much of this is paid by companies but there is also a high public cost.

There may be as many as 2.5 million potentially contaminated sites across Europe, which need to be investigated. Of these, approximately 14 % (340 000 sites) are expected to be contaminated and likely to require remediation. Approximately one third of these contaminated sites have already been identified and around 15 % have been remediated. Traditional remediation involves excavating the contaminated soil and disposing of it in another location.

The findings are based on data collected through the European Environment Agency (EEA) network. They are published in a new report from the European Commission's Joint Research Centre, 'Progress in the management of contaminated sites in Europe'. The data is also published on the EEA website as an indicator assessment.

Accès au document

CIRAD : Recyclage agricole des déchets : quels risques pour les cultures maraîchères ?

Les déchets organiques peuvent aussi avoir un impact néfaste sur les cultures et l'environnement, du fait de la présence de composants potentiellement toxiques : les éléments traces métalliques. Une équipe du Cirad et du Cerege (Interfast), en analysant toute une gamme de déchets organiques, a déterminé leur composition en éléments toxiques et cherché à en expliquer l'origine. ..... Si de nombreuses études se sont intéressées aux concentrations en éléments traces métalliques des produits résiduaires organiques, peu d'entre elles ont tenté d'expliquer l'origine de ces concentrations. Une équipe du Cirad et de l'université d'Aix-Marseille, en analysant les teneurs de ces éléments dans toute une gamme de déchets organiques, a étudié l'influence de trois facteurs : la taille de la ville ou de l'exploitation agricole à l'origine des produits, leur origine géographique et leur type de production.

Voir aussi :

http://www.campagnesetenvironnement.fr/recyclage-des-dechets-organiques-initiative-6610.htmlLes grandes villes et les fermes industrielles produisent les déchets les plus toxiques

Accès au document

Toxicology: The plastics puzzle

Article ciblé sur **la toxicité du bisphénol A et de ses remplaçants, dont le bisphénol S** paru sur le site de la revue NATURE, dans la rubrique Features du numéro du 17 Avril 2014 Volume 508 Number 7496

Extrait : .....BPA is still a constituent of many food containers, especially cans. And when companies did abandon BPA, they often adopted compounds — such as the increasingly common **bisphenol S (BPS)** — that share much of the same chemistry and raise many of the same concerns as BPA. **"People use this chemical to replace BPA without sufficient toxicological information,"** says Kyungho Choi, an environmental toxicologist at Seoul National University. "That is a problem."

...BPA-based epoxy linings are widely used because they are strong, flexible and cheap.....

The similarity of BPS's structure to that of BPA is enough to raise suspicions that it may mimic oestrogens, says Cheryl Watson, a biochemist at the University of Texas Medical Branch in Galveston. Natural oestrogens are small molecules containing several phenolic rings; these bear chemical adornments that bind to a pocket found in oestrogen receptors in the body. BPA and BPS are about the same size and have similar phenolic rings with similar attachments, so they may slot like keys into oestrogen receptors, Watson says.

Watson and a colleague, Rene Viñas, now at the US Food and Drug Administration, measured the responses of cultured rat pituitary cells to BPS. These cells are particularly sensitive to oestrogens and oestrogen mimics, allowing the team to study concentrations of BPS down to 10−15 moles per litre. The team found that even at these very low levels, BPS triggered the enzyme cascade normally activated by an oestrogen called oestradiol2, an effect also seen with BPA. When combined with levels of oestradiol found in adult women, BPS seemed to over-stimulate the pathway, shutting it down and causing cell suicide. The results, says Watson, were typical of those expected of an oestrogen mimic: inappropriate activation of oestrogen responses, disruption of normal oestrogen-response pathways, and eventual cell death.

Others have seen similar effects. Susanne Bremer and her colleagues at the Institute for Health and Consumer Protection, a European Commission-funded research centre in Ispra, Italy, tested BPS and BPA on an oestrogen-sensitive human cell line. They found that both chemicals behaved like oestrogens, but were 100,000-fold less active than oestradiol. Choi and his colleagues discovered that zebrafish exposed to 0.5 micrograms of BPS per litre of water — about one-sixth of the maximum concentration detected in the environment — had fewer eggs, more malformed offspring and higher oestrogen to testosterone ratios than untreated zebrafish. "High concentrations of BPS have the same effect as high concentrations of BPA," says Habert, who has conducted preliminary experiments on the effect of BPS on mouse and human fetal testis cells. "At low concentrations, the effect is unknown."

What concentration best approximates human exposure to BPS is not clear. A team led by Catherine Simoneau of the Institute for Health and Consumer Protection analysed a total of 30 BPS-containing baby bottles from 12 countries. After five minutes in boiling water and two hours at 70 °C, none of the bottles released detectable quantities of BPS. "These materials are far more resistant to hydrolytic breakdown than polycarbonate — that was one of the big selling points," says Schmidt. "As such, I would consider them to be safer than polycarbonate in a food-contact setting."

But people are exposed to BPS in many different ways. Kurunthachalam Kannan, an analytical chemist at the New York State Department of Health in Albany, and his team have found BPS on cash-register receipts, and aeroplane luggage tags and boarding passes, all of which are made from thermal paper containing BPS as a colour developer. The scientists also found BPS in products made from recycled paper, including pizza boxes and food buckets.

Kannan's team estimates that the average daily exposure to BPS through the skin is well below the threshold values for toxic effects. Nevertheless, given the potential for higher levels of exposure from other sources such as food, Kannan urges further studies of the compound. And Watson argues that even small

amounts of oestrogen mimics can cause trouble. "The problem is that they are active in such small quantities," she says. "If you leach even a little, you still leach enough for responses to happen."

Branching out

Some manufacturers have left the bisphenol family in search of a replacement. In 2007, the Eastman Chemical Company launched Tritan — a new heat-resistant clear plastic — for infant-care products such as baby bottles. This BPA-free plastic has since replaced the old BPA-containing polycarbonate in many water bottles, food containers and children's cups. Eastman says that the results of testing, analysed by Thomas Osimitz of Science Strategies, a consulting firm in Charlottesville, Virginia, and his colleagues, verified that Tritan's monomers do not bind to oestrogen or androgen receptors.

In 2011, George Bittner, a neurobiologist at the University of Texas at Austin and the chief executive of Austin-based chemical-testing company CertiChem, reported that 92% of 102 commercially available plastic products leached chemicals with oestrogenic activity7. This included plastics advertised as BPA-free. The reason, Bittner says, is that additives in plastics — such as stabilizers and lubricants — can also bind to oestrogen receptors, as can some of the plastic monomers themselves…

It is not yet clear how many of these chemicals are dangerous at the concentrations found in the plastics. But mixed together, the chemicals could have synergistic effects. Watson and Viñas recently studied the effect of the oestrogen mimics BPA, BPS and nonylphenol (a detergent precursor) on cultured rat pituitary cells. They found that a combination of two or three of the compounds caused greater disruption to the oestrogen-signalling system — and did so at lower concentrations — than did a single compound. "We don't experience any of these chemicals alone," Watson says. "A lot of other chemicals mimic oestrogens."

Ideally, says Watson, the next generation of chemicals would be tested for effects on oestrogen signalling before widespread deployment in food containers. To that end, she and a group of biologists and chemists have put together a plan called TiPED, or Tiered Protocol for Endocrine Disruption. Under this testing system, newly synthesized chemicals would be evaluated for endocrine-disrupting potential at five different stages, from initial computational analysis of structure to whole-animal experiments.

The goal is to form a consortium of independent laboratories that would test chemicals on request by plastics companies….

The TiPED proposal is designed to ensure that endocrine-disrupting chemicals no longer reach the market. For Watson and many other researchers, the current situation raises concern because there are so many untested compounds found in countless plastic products. Those chemicals, she says, "are really all around us".

Accès au document

INRA - Nouvelle classe de bisphénols biosourcés pour des applications en chimie des polymères

Extrait du site de l'INRA. Des chercheurs de l'Inra et d'AgroParisTech ont mis au point une méthode bio-catalysée pour fabriquer à partir de biomasse végétale, une gamme de molécules pouvant être proposées en substitution au bisphénol A et dont les propriétés d'usage peuvent être orientées.

L'utilisation controversée du bisphénol A

Les composés bisphénoliqués entrent dans la composition de différents polymères plastiques (polycarbonates, polyesters, polyuréthanes…). Peu chers, ils présentent l'avantage de conférer aux matrices des propriétés thermomécaniques, plastifiantes et /ou anti-oxydantes ce qui est recherché pour des applications emballage notamment. Leur principal inconvénient : **leur toxicité avérée** vis-à-vis de l'Homme et plus globalement de l'Environnement. A terme, l'évolution de la réglementation REACH vise à interdire leur emploi et notamment celle du bisphénol A (BPA) pour des produits destinés à être en contact avec l'homme (secteur de l'emballage, de la santé …)

Partir de phénols végétaux pour éco-produire une gamme de molécules de substitution aux propriétés ajustables

La méthodologie développée par les chercheurs utilise spécifiquement des « matières premières » d'origine végétale avec 1) des molécules plate-forme issues de la conversion des polysaccharides pariétaux, 2) de l'acide férulique provenant de la lignocellulose et 3) du glycérol. Les deux premières étapes de la synthèse sont des transformations couramment utilisées dans l'industrie avec un impact environnemental limité. La troisième étape est une condensation bio-catalysée qui fait intervenir une lipase commerciale. Elle ne nécessite ni le recours à des réactions de protection /dé-protection chimique, ni l'emploi de solvants. La méthode est très flexible puisqu'elle permet de condenser un dérivé de l'acide férulique à différentes molécules : polyols, polyamines… pour produire une gamme élargie de molécules aux propriétés modulables.

Les nouvelles molécules bisphénoliques obtenues présentent une excellente stabilité thermique jusqu'à la température de 250 °C. Elles peuvent être utilisées comme anti-oxydant/anti-radicalaire et /ou comme plastifiant biosourcés et ne présentent pas d'activité de nature à perturber le fonctionnement endocrinien.

Une application innovante : La synthèse de nouvelles « matières plastiques » biosourcées

Du fait de leurs propriétés, ces nouveaux bisphénols pourraient être employés en tant que molécules de substitution au bisphénol A pour la fabrication d'emballages alimentaires. Ils pourraient aussi être utilisés comme monomères pour synthétiser de nouveaux polyesters, polyuréthanes… ou après fonctionnalisation comme monomères pour la synthèse de polyamides, polyoléfines. L'éventail des molécules et des applications potentielles est très large…

Accès au document

Collaboration franco-norvégienne sur l'écotoxicologie

16/04/2014 Le projet EPOSCAL (Effets des polluants - micropolluants et diesel marin - sur les pétoncles, Chlamys sp.) a été conduit dans le cadre d'une collaboration franco-norvégienne associant le laboratoire LIENSs (LIttoral ENvironnement et Sociétés, La Rochelle, France) avec l'Institut Akvaplan-Niva (Tromsø, Norvège). Ce projet, financé par l'Ambassade Royale de Norvège, avait pour objectif d'unir ces deux pays autour d'une thématique de recherche commune incluse dans le cadre des politiques européennes et norvégiennes de protection de l'environnement.

.... un autre projet (PECTIMPACT : Approche multidisciplinaire autour des PECTinidae Chlamys sp.: IMPACT d'une contamination chimique), également financé par l'Ambassade Royale de Norvège, a également été mis en place, compte tenu de ces résultats. En plus de son intérêt environnemental évident, la rapidité avec laquelle il a été réalisé, son caractère novateur et multidisciplinaire mettront l'accent sur l'excellence et la compétitivité de la recherche scientifique française et norvégienne, et permettront donc de promouvoir son expansion et son internationalisation.

Accès au document

Utilisation des nanoparticules de fer zéro-valent dans le traitement des boues d'épuration : bénéfice ou risque ?

Contribution de Yann Sivry, IPGP, UMR 7154, CNRS au bulletin de veille de l'ANSES de Mars 2014 (page 15)

Partant du constat qu'il "existe aujourd'hui dans la littérature autant d'études portant sur l'apport de l'utilisation des nZVI(3) pour la dépollution des sols ou des eaux/boues résiduaires que d'études démontrant leur impact sur l'activité microbiologique dans ces différents milieux, l'auteur présente et commente trois publications qui illustrent la difficulté actuelle d'évaluer la balance bénéfice-risque des nZVI(3) pour le traitement des boues résiduaires.

Les trois articles sont :

Stabilisation de boue d'épuration en présence de fer zéro-valent nanométrique (nZVI) : réduction

de l'odeur et amélioration de la production de biogaz. Su L, Shi X, Guo G, Zhao A, Zhao Y. Stabilization of sewage sludge in the presence of nanoscale zero-valent iron (nZVI): abatment of odor and improvement of biogas production. J Mater Cycles Waste Manag 2013;15:461-8.

Impact du fer zéro-valent nanométrique (nZVI) sur l'activité méthanogénique et la dynamique des populations en digestion anaérobique Yang Y, Guo J, Hu Z. Impact of nano zero valent iron (nZVI) on methanogenic activity and population dynamics in anaerobic digestion. Wat Res 2013;47:6790-6800.

Effets des particules nanométriques de fer zéro-valent sur l'élimination biologique de l'azote et du phosphore et sur les microorganismes, dans une boue activée. Wu D, Shen Y, Ding A, Mahmood Q, Liu S, Tu Q. Effects of nanoscale zero-valent iron particles on biological nitrogen and phosphorus removal and microorganisms in activated sludge. J Hazard Mater 2013;262:649-55.

Accès au document

Forum biocontrôle à la Cité des sciences et de l'industrie - Ministère de l'agriculture, de l'agroalimentaire et de la forêt

Mardi 22 avril 2014 se tiendra à la Cité des Sciences et de l'Industrie à Paris un forum dédié au biocontrôle : "*Une filière d'avenir pour produire autrement*", organisé par le ministère de l'agriculture, de l'agroalimentaire et de la forêt. Dans le cadre du plan Ecophyto et de la loi d'avenir portée par Stéphane Le Foll, cette journée regroupera différents acteurs de la filière avec un accent mis sur les start-up.

Voir le programme et le dossier participant

Les participants pourront mieux appréhender les enjeux de la filière autour de temps de présentations et de quatre ateliers :

N°1 : Quels besoins en recherche et développement et quels outils de formation nécessaires sur les produits de biocontrôle?

N°2 : Quelle valorisation et quel soutien aux PME pour l'innovation, le développement et l'export de produits de biocontrôle?

N°3 : Quelles solutions de biocontrôle pour les Outre-Mer ?

N°4 : Comment aborder la problématique des zones non agricoles?

Des temps d'échanges seront ensuite organisés afin de débattre et de partager.

Accès au document

Crop protection Industry urges stronger regulatory framework between US, EU-CropLife, CropLife America, ECPA, USA, EU, crop protection, regulation, 1107/2009

CropLife America (CLA) and the European Crop Protection Association (ECPA) called for a more harmonized risk assessment framework for pesticide regulations during the fourth round of negotiations of the Transatlantic Trade and Investment Partnership (TTIP). The comments follow the submission of a joint proposal on U.S. - EU regulatory cooperation that CLA and ECPA sent to Assistant United States Trade Representative Daniel Mullaney and Director of DG Trade for the European Commission Ignacio Garcia Bercero on March 7, 2014.

The proposal emphasized the need for a science-based risk assessment framework for pesticide regulations in alignment with the principles established by the World Trade Organization (WTO) Agreement on the Application of Sanitary and Phytosanitary Measures (SPS). Both the U.S. and EU are signatories to the WTO Agreement. .....

To download CLA and ECPA's "Proposal on U.S.-EU Regulatory Cooperation," click here.

Accès au document

USDA provides $3 million fund to improve pollinator health-USDA NRCS, fund, improve pollinator health, agricultural production

Le site Agropages annonce des aides à la recherche et aux agriculteurs mettant en œuvre des actions favorables à la santé des pollinisateurs ...parmi les thèmes abordés , les pesticides ... The US Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) will provide close to **$3 million** in technical and financial assistance for interested farmers and ranchers to help improve the health of bees....

The funding is a focused investment to improve pollinator health and will be targeted in five Midwestern states of U.S., Michigan, Minnesota, North Dakota, South Dakota, and Wisconsin.

Funding will be provided through the Environmental Quality Incentives Program (EQIP) to promote conservation practices that

will provide honey bees with nutritious pollen and nectar while providing benefits to the environment. ...

... ARS is conducting research into all aspects of bee genetics, breeding, biology and physiology, with special focus on bee nutrition, control of pathogens and parasites, the effects of pesticide exposure and the interactions between each of these factors.

Accès au document

EFSA News Story: Call for European research network to address bee losses

Closer cooperation among EU agencies, Member States and researchers is urgently needed to improve understanding of how multiple stressors damage bee health. That is one of the conclusions of a report published today by EFSA, which also proposes that a centralised, open-access research database be created to support the development of a holistic approach to assessing bee stressors.

…. EFSA proposes a network that would encompass the European Commission's Bee Interservice Group; the European Reference Laboratory for Bee Health; Member State bodies such as the French food safety agency ANSES; other EU agencies such as the European Medicines Agency (EMA); and international organisations.

The network is one of the recommendations made in an EFSA overview of work on bee risk assessment being carried out across the EU. The aim of the report, which was compiled in cooperation with the European Commission and Member States, is to highlight knowledge gaps and suggest research that would assist the development of a harmonised environmental risk assessment scheme for bees.

EFSA also recommends the formation of an open-access, centralised database of information and methods that can be used to assess the risks from single and multiple stressors. Several databases have been developed to promote data sharing, but there is no single, publicly accessible repository.

EFSA will give a short presentation of the report at the Conference for Better Bee Health, hosted by the European Commission in Brussels on April 7, 2014.

Accès au document

EFSA News Story: Apple snail poses a serious threat to south European wetlands

Avis de l'Efsa en date du 30 Avril 2014

The apple snail could have massive consequences for biodiversity if it establishes in the freshwater wetlands of southern Europe. The risk is high for species such as amphibians and for some already threatened species, as well as for the diversity of native species and habitats. A snail invasion could also jeopardise ecosystem services of the affected wetlands such as the supply of good quality freshwater and the regulation of pests and diseases. These are some of the conclusions of EFSA's environmental risk assessment of apple snails from the genus Pomacea.

In 2010 apple snails invaded rice fields in the Ebro Delta in Spain. Until then, they were not present in the wild in the EU and were not regulated. The snail invasion is still spreading in the Ebro Delta despite the control and eradication measures in place in the rice paddies, and Pomacea is now considered a threat to the freshwater wetlands of southern Europe.

EFSA carried out the risk assessment using for the first time its Guidance on the Environmental Risk Assessment (ERA) of Plant Pests, which focusses on possible risks to both biodiversity and ecosystem services. The Panel on Plant Health performed two assessments: one for the short term (five years) and one for the long term (30 years).

On biodiversity, the Panel's main conclusions are:

-For genetic diversity and native species diversity the risk is major both in the short and the long term.-For native habitats the risk is massive in the short term and major in the long term.

-For threatened species and habitats of high conservation values the risk is massive in both the short and the long term.

-The overall risk to biodiversity is massive in the short term and major in the long term.

For ecosystem services, the Panel concludes:

The risk for genetic resources, climate regulation, pest and disease regulation, and pollination is moderate for the short and long term. The risk for food is moderate in the short term and major in the long term. For water and erosion regulation the risk is major in both the short and the long term. The risk for freshwater is massive in both the short and long term. For nutrient cycling and photosynthesis and primary production of macrophytes the risk is massive in the short term and major in the long term.

The overall risk to ecosystem services is major in both the short and long term.

Accès au document