Bulletin de veille du réseau d'écotoxicologie terrestre et aquatique N°55

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Bulletin de veille du réseau d'écotoxicologie terrestre et aquatique

ECOTOX N°55, Février 2022

Réalisé par l'équipe de veille sur la période du 1er janvier au 28 février 2022.
Colette Bertrand, Christian Mougin (UMR 1402 EcoSys), Annette Berard (UMR 1114 EMMAH), Soizic Morin (UR 1454 EABX), Olivier Crouzet (UPFS – OFB), Sonia Grimbuhler (UMR 1463 ITAP) et Pascale Karmasyn-Veyrines (DipSO)

Edito

Voici notre 55ème bulletin de veille, qui nous espérons toujours informatif !

Nous formalisons dans ce bulletin une nouvelle rubrique pesticides et santé des agriculteurs. Nous vous proposons également une tribune concernant la description et la gestion des échantillons environnementaux : vers la mise en place de pratiques partagées entre les Infrastructures de Recherche AnaEE-France et RARe. La tribune est téléchargeable sous forme de fiche thématique sur notre site ECOTOX : https://www6.inrae.fr/ecotox/Productions/Fiches-thematiques/Fiche-thematique-N-37-fevrier-2022
Nous vous rappelons notre PCI pour la soumission de vos preprints : https://ecotoxenvchem.peercommunityin.org/

N'oubliez pas de nous transmettre les informations que vous souhaitez diffuser, notamment vos publications que nous pourrions avoir oubliées.

L'équipe vous souhaite une bonne lecture de ce bulletin !

Contact : veille-ecotox@inrae.fr

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Tribune libre

Description et gestion des échantillons environnementaux : vers la mise en place de pratiques partagées entre les Infrastructures de Recherche AnaEE-France et RARe

Introduction

Les programmes d'expérimentation et d'observation en sciences de l'environnement, incluant ceux dans le champ de l'écotoxicologie, mettent en œuvre de nombreux prélèvements, tant en milieu naturel qu'en laboratoire. Les échantillons ainsi collectés doivent être gérés de façon appropriée avant les analyses (chimique, génomique, biochimique…) destinées à leur caractérisation, mais également après ces premières analyses, de façon à permettre une réutilisation optimale sur le long terme. Une bonne gestion des échantillons permet également d'éviter des prélèvements excessifs ou inutiles, et de protéger les ressources environnementales.

Dans la démarche qualité mise en place par les infrastructures de recherche, la gestion des échantillons s'inscrit pleinement dans les objectifs de fiabilité des résultats mesurables et de traçabilité des travaux de recherche. La mutualisation de « bonnes pratiques », par des actions transversales inter-infrastructures, est une manière efficace d'améliorer la gestion des échantillons au sein des collectifs de recherche, en laissant les marges d'adaptations adéquates en fonction des spécificités de chacune.

AnaEE-France (Analyse et Expérimentation sur les Ecosystèmes) a initié une réflexion visant à faire un état des lieux des pratiques de gestion des échantillons au sein de ses plateformes, et soutient un projet de mise en place de pratiques partagées avec l'infrastructure RARe (Ressources agronomiques pour la recherche).

Les infrastructures de recherche

AnaEE-France est une Infrastructure de Recherche dédiée à l'étude des écosystèmes continentaux et de leur biodiversité. Elle offre à la communauté scientifique internationale, aux entreprises et aux organisations issues de la société civile un accès à des dispositifs expérimentaux (en milieu contrôlé ou naturel) sur le territoire national métropolitain et ultramarin. L'infrastructure accompagne également la réalisation des projets en proposant un accès aux données et à ses plateformes analytiques. Dans le cadre de leurs expérimentations, menées en propre ou avec des partenaires extérieurs à l'infrastructure, ces plateformes sont amenées à prélever, conserver et parfois distribuer des échantillons.

RARe est une Infrastructure de Recherche qui rassemble cinq réseaux de Centres de Ressources Biologiques (CRB) conservant les ressources génétiques, génomiques, et biologiques, assemblées et caractérisées par la recherche sur les animaux domestiques et leurs espèces sauvages apparentées, les plantes modèles ou cultivées, les arbres forestiers, les micro-organismes d'intérêt agronomique ou agro-alimentaire, les micro-organismes et organismes de l'environnement, les matrices environnementales. RARe est en capacité de maintenir une grande diversité de ressources documentées, à en collecter de nouvelles, à contribuer à leur caractérisation, à les conserver de façon sécurisée, à les distribuer et à gérer des données associées. La valeur ajoutée de l'infrastructure consiste à mutualiser les compétences, harmoniser les pratiques, susciter des projets de recherche et proposer un portail d'entrée unique pour faciliter l'accès à des échantillons, en tenant compte du contexte réglementaire (sanitaire, juridique : protocole de Nagoya et loi française sur la biodiversité…). Au sein de RARe, le pilier environnement BRC4Env soutient la recherche visant à caractériser les composantes biologiques de l'environnement agricole (sol, eau, air) et leur dynamique.

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Le programme inter-infrastructures description et gestion des échantillons

Le programme développé entre les deux infrastructures de recherche vise à mettre en place différentes actions collaboratives concernant la description et la gestion des échantillons environnementaux entre AnaEE-France et RARe pour :

- Accroître le transfert de compétences et de connaissances entre les 2 infrastructures via leurs plateformes expérimentales et analytiques et les Centres de Ressources Biologiques (CRBs),
- Accroitre leur interopérabilité sur la question de la gestion des échantillons et données associées,
- Mettre en place de procédures partagées, synthétisées dans un livret de recommandations,
- Produire un plan de formation.

La démarche adoptée

A l'issue du recrutement d'une chargée de projet, une première action a été de mettre en place un comité de pilotage formé de représentants des 2 infrastructures. Ce comité, sur la base de la réflexion engagée fin 2019 grâce au soutien d'AnaEE-France, a permis de construire un formulaire d'enquête à destination de l'ensemble des plateformes AnaEE-France. Des entretiens ciblés avec les porteurs de quelques plateformes ont permis d'affiner ce questionnaire, qui a été ensuite mis en ligne pour l'ensemble des plateformes. Le questionnaire portait sur le cycle de vie des échantillons (Figure 1), avec un focus concernant les pratiques de collecte et/ou de prélèvement d'échantillons, leur identification, la conservation, la caractérisation, la gestion des données analytiques, la distribution des échantillons, les ressources humaines de la plateforme et les besoins en termes de formation.

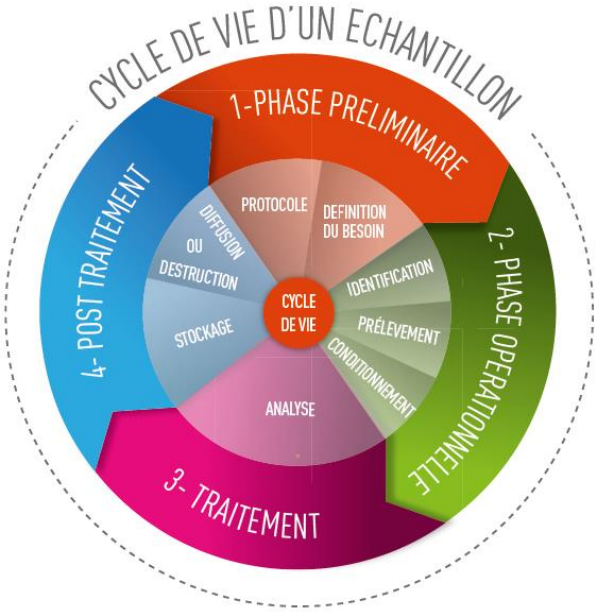

Figure 1. Cycle de vie d'un échantillon (INRA, 2014)

Les résultats majeurs

Notre synthèse révèle que la plupart des plateformes (parmi les 33 questionnées) collectent et/ou prélèvent des échantillons environnementaux (sols, animaux, végétaux…) sans toutefois en assurer systématiquement la conservation ou la caractérisation. Trois plateformes gèrent déjà leurs échantillons en partenariat avec des Centres de Ressources Biologiques (CRBs) affiliés à RARe (une plateforme est par ailleurs adossée à un CRB de RARe) et cinq sont intéressées par l'établissement d'un partenariat. La plupart des plateformes expriment

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un besoin d'amélioration et/ou de standardisation de leurs pratiques (identification, étiquetage, bases de données…), mais expriment aussi des limites en ressources humaines à consacrer à la gestion des échantillons. Une dizaine souhaitent être formées à la gestion des échantillons.

Certaines plateformes expriment leur limitation en termes de capacité de stockage, notamment sur le long terme.

Les suites à donner

Une offre de formation sera co-construite entre les infrastructures de recherche et proposées en 2022/2023 aux plateformes demandeuses.

Plusieurs pistes sont lancées sur le plan opérationnel :

- Identification des échantillons, qui devrait reposer sur un numéro unique (voir pour cela la BioSample database) qui renvoie à l'ensemble des données disponibles,
- Caractérisation des échantillons, pour favoriser les collaborations avec les plateformes analytiques (séquençage, métabolomique…) partenaires pour mieux connaître les échantillons/ressources, et éviter des prélèvements excessifs/inutiles,
- Partage de protocoles, pour connaître les contraintes associées à la réalisation de certaines analyses, disposer de réelles recommandations de conservation pour faciliter la caractérisation,
- Echange de données, pour disposer du maximum de métadonnées pour une caractérisation complète de l'échantillon, créer des référentiels de données.

Enfin, des conventions de stockage entre les plateformes AnaEE-France et les CRB de RARe pourraient être mises en place (comme la cession, ou la destruction ou le retour aux propriétaires…).

Contacts

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Pour en savoir plus

Au sein de l'IR RARe (Ressources agronomiques pour la recherche), le pilier Environnement (BRC4Env) met en réseau des Centres de Ressources Biologiques et des collections de nature variée (sols, invertébrés, tissus de poissons, microorganismes…). Ces ressources biologiques sont utiles aux recherches dans le champ de l'agroécologie, notamment pour 1) décrire, documenter et caractériser les différentes composantes de l'environnement, 2) développer des procédés à des fins de biocontrôle des ravageurs des cultures, dans le cadre de programmes de recherche portant la santé des écosystèmes, des végétaux, des animaux et de l'homme. Fiche thématique BRC4Env : https://www6.inrae.fr/ecotox/Productions/Fiches-thematiques/Fiche-thematique-N-12-Decembre-2017

La plateforme de biochimie environnementale Biochem-Env ambitionne d'accroître la connaissance des indicateurs biochimiques sensibles aux perturbations, et de faciliter leur utilisation par la communauté scientifique. Biochem-Env est une plateforme AnaEE-France et participe à la caractérisation d'échantillons des CRBs du pilier BRC4Env. Biochem-Env (https://doi.org/10.15454/HA6V6Y) est une plateforme analytique de l'Infrastructure nationale de Recherche AnaEE-France, bénéficiant d'une aide de l'État français gérée par l'Agence nationale de la recherche au titre du Programme « Investissements d'avenir » (ANR-11-INBS-0001). Fiche thématique Biochem-Env : https://www6.inrae.fr/ecotox/Productions/Fiches-thematiques/Fiche-thematique-N-10-Aout-2017

Portail web AnaEE-France : https://www.anaee-france.fr/

Portail web AgroBRC-RARe : https://www.agrobrc-rare.org/

Portail web BRC4Env : https://www.brc4env.fr/

Portail web Biochem-Env : https://www.biochemenv.fr/

Bibliographie citée

Guide Gestion des échantillons, 2014. Délégation à la qualité. INRA

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Biogeochemical indicators (waters/diatoms) of acid mine drainage pollution in the Odiel river (Iberian Pyritic Belt, SW Spain)

Authors: Cordoba F, Luis, AT, Leiva M et al.

Source: ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH Early Access, 2022, DOI 10.1007/s11356-021-18475-2

Abstract: Odiel river basin is located in the Iberian Pyritic Belt (IPB) and mostly of its tributaries are severely affected by acid mine drainage (AMD). It is originated when pyritic minerals from abandoned mines, especially mineral residues from waste rock dams, get in contact with air and water. Fifteen sampling points were chosen to analyze interactions between diatom communities and water hydrogeochemistry...

Effects of long-term exposure to silver nanoparticles on the structure and function of microplastic biofilms in eutrophic water

Authors: Niu LH, Hu JX, Li Y et al.

Source: ENVIRONMENTAL RESEARCH 207: 112182, 2022, DOI 10.1016/j.envres.2021.112182

Abstract: Microplastics are frequently detected in natural aquatic systems proximate to populated areas, such as urban rivers and lakes, and can be rapidly colonized by microbial communities. Microplastics and silver nanoparticles (AgNPs) share similar pathways into natural waters and tend to form heteroaggregations. However, very little is known about the long-term impacts on the structure and function of microplastic biofilms when chronically exposed to silver nanoparticles. Thus, the present study assessed the accumulation property of AgNPs on polymethyl methacrylate (PMMA) microplastics via adsorption tests and studied the chronic effects of AgNPs on the structure and function of microplastic biofilms via 30-day microcosmic experiments in eutrophic water...

Composition of Seagrass Root Associated Bacterial Communities Are Linked to Nutrients and Heavy Metal Concentrations in an Anthropogenically Influenced Estuary

Authors: Martin BC, Middleton JA, Skrzypek G et al.

Source: FRONTIERS IN MARINE SCIENCE 8: 768864, 2022, DOI 10.3389/fmars.2021.768864

Abstract: Seagrasses are globally recognized as bioindicators of marine eutrophication and contamination. Seagrasses also harbor a distinct root microbial community that largely reflects the conditions of the surrounding environment as well as the condition of the seagrass. Hence monitoring changes in the root microbial community could act as an additional biological indicator that reflects both the seagrass health condition, as well as potential deterioration in coastal waters. We used 16S rRNA gene sequencing combined with analysis of seagrass nutrients (C, N, delta N-15, delta C-13) and tissue metal concentrations to

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investigate potential links between seagrass (Halophila ovalis) root bacteria and seagrass nutrient and metal concentrations within an anthropogenically influenced estuary...

Seawater copper content controls biofilm bioaccumulation and microbial community on microplastics

Authors: Djaoudi K, Onrubia JAT, Boukra A et al.

Source: SCIENCE OF THE TOTAL ENVIRONMENT 814: 152278, 2022, DOI 10.1016/j.scitotenv.2021.152278

Abstract: The adsorption of trace metals on microplastics (MPs) is affected by the presence of surficial biofilms but their interactions are poorly understood. Here, we present the influence of Cu levels in real seawater (Toulon Bay, NW Mediterranean Sea) on microbial communities and Cu content of the resulting biofilms grown during incubation experiments on high density polyethylene. Two sets of incubation experiments were run with seawater supplied with MPs, sampled in two sites with contrasting Cu levels: Pt12 (most contaminated site) and Pt41P (less contaminated site). For each incubation experiment, 5 treatments were considered differing in Cu concentrations, ranging between 30 and 400 nM and between 6 and 60 nM, for Pt12 and Pt41p, respectively. A control experiment (filtered at 0.2 mu m) was run in parallel for each incubation experiment...

Surface Coating-Modulated Phytotoxic Responses of Silver Nanoparticles in Plants and Freshwater Green Algae

Authors: Biba R, Kospic K, Komazec B et al.

Source: NANOMATERIALS 12: 24, 2022, DOI 10.3390/nano12010024

Abstract: Silver nanoparticles (AgNPs) have been implemented in a wide range of commercial products, resulting in their unregulated release into aquatic as well as terrestrial systems. [...] Once released into the environment, they are prone to various transformation processes that modify their reactivity. In order to increase AgNP stability, different stabilizing coatings are applied during their synthesis. However, coating agents determine particle size and shape and influence their solubility, reactivity, and overall stability as well as their behavior and transformations in the biological medium. In this review, we attempt to give an overview on how the employment of different stabilizing coatings can modulate AgNP-induced phytotoxicity with respect to growth, physiology, and gene and protein expression in terrestrial and aquatic plants and freshwater algae...

Review of aquatic toxicity of pharmaceuticals and personal care products to algae

Authors: Xin XY, Huang G, Zhang BY

Source: JOURNAL OF HAZARDOUS MATERIALS 410: 124619, 2022, DOI 10.1016/j.jhazmat.2020.124619

Abstract: Pharmaceuticals and Personal Care Products (PPCPs) have been frequently detected in the environment around the world. Algae play a significant role in aquatic ecosystem, thus the influence on algae may affect the life of higher trophic organisms. This review provides a state-of-the-art overview of current research on the toxicity of PPCPs to algae. Nanoparticles, contained in personal care products, also have been considered as the ingredients of PPCPs. PPCPs could cause unexpected effects on algae and their communities...

Responses of Bacterial Taxonomical Diversity Indicators to Pollutant Loadings in Experimental Wetland Microcosms

Authors: Roy SG, Wimpee CF, McGuire SA, Ehlinger TJ

Source: WATER 14: 251, 2022, DOI 10.3390/w14020251

Abstract: Urbanization results in higher stormwater loadings of pollutants such as metals and nutrients into surface waters. [...] This study explores the pattern of bacterial responses to metal and nutrient pollution loading and seeks to evaluate whether bacterial indicators can be effective as a biomonitoring risk assessment tool for wetland ecosystems. Microcosms were built containing sediments collected from wetlands in the urbanizing Pike River watershed in southeastern Wisconsin, USA, with metals and nutrients added at 7 day intervals. Bacterial DNA was extracted from the microcosm sediments, and taxonomical profiles of bacterial communities were identified up to the genera level by sequencing 16S bacterial rRNA gene (V3-V4 region)...

Individual and Binary Mixture Toxicity of Five Nanoparticles in Marine Microalga *Heterosigma akashiwo*

Authors: Pikula K, Johari SA, Santos-Oliveira R, Golokhvast K

Source: INTERNATIONAL JOURNAL OF MOLECULAR SCIENCES 23: 990, 2022, DOI 10.3390/ijms23020990

Abstract: The investigation of the combined toxic action of different types of nanoparticles (NPs) and their interaction between each other and with aquatic organisms is an important problem of modern ecotoxicology. In this study, we assessed the individual and mixture toxicities of cadmium and zinc sulfides (CdS and ZnS), titanium dioxide (TiO_2), and two types of mesoporous silicon dioxide (with no inclusions and with metal inclusions) by a microalga growth inhibition bioassay. The counting and size measurement of microalga cells and NPs were performed by flow cytometry. The biochemical endpoints were measured by a UV-VIS microplate spectrophotometer...

Microbial diversity in intensively farmed lake sediment contaminated by heavy metals and identification of microbial taxa bioindicators of environmental quality

Authors: Custodio M, Espinoza C, Penaloza R et al.

Source: SCIENTIFIC REPORTS 12: 80, 2022, DOI 10.1038/s41598-021-03949-7

Abstract: The cumulative effects of anthropogenic stress on freshwater ecosystems are becoming increasingly evident and worrisome. In lake sediments contaminated by heavy metals, the composition and structure of microbial communities can change and affect nutrient transformation and biogeochemical cycling of sediments. In this study, bacterial and archaeal communities of lake sediments under fish pressure contaminated with heavy metals were investigated by the Illumina MiSeq platform...

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Metagenomic analysis reveals the response of microbial community in river sediment to accidental antimony contamination

Authors: Chen XL, Wang J, Pan CY et al.

Source: SCIENCE OF THE TOTAL ENVIRONMENT 813: 152484, 2022, DOI 10.1016/j.scitotenv.2021.152484

Abstract: The mining of deposits containing metals like antimony (Sb) causes serious environmental issues that threaten human health and ecological systems. However, information on the effect of Sb on freshwater sediment microorganisms and the mechanism of microbial Sb resistance is still very limited. This was the first attempt to explore microbial communities in river sediments impacted by accidental Sb spill...

Relative sensitivity of duckweed *Lemna minor* and six algae to seven herbicides

Authors: Ueda K, Nagai T

Source: JOURNAL OF PESTICIDE SCIENCE 46: 267-273, 2021, DOI 10.1584/jpestics.D21-018

Abstract: We investigated the relative sensitivity of duckweed *Lemna minor* and six species of algae to seven herbicides, using an efficient high-throughput microplate-based toxicity assay. First, we assessed the sensitivity of *L. minor* to the seven herbicides [cyclosulfamuron, pretilachlor, esprocarb, pyraclonil, pyrazoxyfen, simetryn, 2,4-D], and then we compared its sensitivity to that of previously published data for six algal species based on EC50 values...

Heavy metal-induced stress in eukaryotic algae-mechanisms of heavy metal toxicity and tolerance with particular emphasis on oxidative stress in exposed cells and the role of antioxidant response

Authors: Nowicka B

Source: ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH Early Access, 2022, DOI 10.1007/s11356-021-18419-w

Abstract: Heavy metals is a collective term describing metals and metalloids with a density higher than 5 g/cm(3). Some of them are essential micronutrients; others do not play a positive role in living organisms. Increased anthropogenic emissions of heavy metal ions pose a serious threat to water and land ecosystems. The mechanism of heavy metal toxicity predominantly depends on (1) their high affinity to thiol groups, (2) spatial similarity to biochemical functional groups, (3) competition with essential metal cations, (4) and induction of oxidative stress. The antioxidant response is therefore crucial for providing tolerance to heavy metal-induced stress. This review aims to summarize the knowledge of heavy metal toxicity, oxidative stress and antioxidant response in eukaryotic algae...

Spatiotemporal and teratological analyses of diatom assemblages from sediments contaminated with industrial effluents in the St. Lawrence River near Cornwall (Ontario, Canada)

Authors: Moir KE, Ridal JJ, Cumming BF

Source: HYDROBIOLOGIA Early Access, 2022, DOI 10.1007/s10750-021-04792-7

Abstract: Throughout the twentieth century, waterfront industries in Cornwall (Ontario, Canada) discharged significant quantities of mercury (Hg) and other industrial effluents to the St. Lawrence River (SLR), which accumulated in

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downstream sediments and currently persist in some nearshore areas. While a great deal of research has investigated the bioavailability and movement of this legacy Hg up the food web, considerably less is understood about its impacts on the algae that live on these contaminated sediments. This study examined diatom (Bacillariophyceae) responses to present-day and historical sedimentary contamination on the SLR at Cornwall. Surface sediments collected from contaminated zones and upstream reference sites were analyzed alongside a dated sediment core from a contaminated area to evaluate the diatom community assemblage shifts and cell deformations (teratologies) in response to elevated concentrations of sedimentary Hg and other contaminants...

Toxicity mechanism of cerium oxide nanoparticles on cyanobacteria *Microcystis aeruginosa* and their ecological risks

Authors: Wu D, Zhang JJ, Du WC et al.

Source: ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH Early Access, 2022, DOI 10.1007/s11356-021-18090-1

Abstract: The extensive application of cerium oxide nanoparticles (CeO_2 NPs), a type of rare earth nanomaterial, led to pollution into aquatic environments. Cyanobacteria, a significant component of freshwater ecosystems, can interact with CeO_2 NPs. However, little attention has been paid as to whether CeO_2 NPs will have adverse effects on cyanobacteria. In the present study, Microcystis aeruginosa was exposed to different concentrations (0, 1, 10, and 50 mg/L) of CeO2 NPs...

Effects of heavy metals and hyporheic exchange on microbial community structure and functions in hyporheic zone

Authors: Liang D, Song JX, Xia J et al.

Source: JOURNAL OF ENVIRONMENTAL MANAGEMENT 303: 114201, 2022, DOI 10.1016/j.jenvman.2021.114201

Abstract: The responses of microbial communities in hyporheic zone to the eco-hydrological process have been a hotspot in river ecological health research. However, the impact of different metal pollution levels and hyporheic exchange on the microbial communities are still unclear. In this study, we further explored the effects of different degrees of heavy metals pollution and the strength of hyporheic exchange on the structures and functions of microbial community in hyporheic zone sediment ecosystem. Sediments were collected from the Weihe River to determine the concentrations of heavy metals, grain size distribution, and hydraulic conductivity, and the microbial information were obtained by eDNA technology...

Physiological, biochemical and transcriptional responses of cyanobacteria to environmentally relevant concentrations of a typical antibiotic-roxithromycin

Authors: Xin RX, Yu X, Fan J

Source: SCIENCE OF THE TOTAL ENVIRONMENT 814: 152703, 2022, DOI 10.1016/j.scitotenv.2021.152703

Abstract: The frequent occurrence of antibiotics in source waters may affect the formation of harmful algal blooms (HABs) dominated by the cyanobacterium *Microcystis aeruginosa*. However, it remains poorly understood whether dissolved algal organic matters can be altered by the introduction of antibiotics in source waters. To resolve these discrepancies, this study investigated the physiological, biochemical, and transcriptional responses of a toxigenic strain of

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M. aeruginosa to the commonly-detected antibiotic roxithromycin at environmentally relevant concentrations ranging from 30 to 8000 ng L^{-1}...

Toxicity of selenium nanoparticles on *Poterioochromonas malhamensis* algae in Waris-H culture medium and Lake Geneva water: Effect of nanoparticle coating, dissolution, and aggregation

Authors: Chen YY, Liu W, Leng XJ, Stoll S

Source: SCIENCE OF THE TOTAL ENVIRONMENT 808: 152010, 2022, DOI 10.1016/j.scitotenv.2021.152010

Abstract: Understanding the algal toxicity of selenium nanoparticles (SeNPs) in aquatic systems by considering SeNPs physico-chemical properties and environmental media characteristics is a concern of high importance for the evaluation and prediction of risk assessment. In this study, chitosan and sodium carboxymethyl cellulose coated SeNPs are considered using Lake Geneva water and a Waris-H cell culture medium to investigate the effect of SeNPs on the toxicity of algae *Poterioochromonas malhamensis*, a widespread mixotrophic flagellate. The influence of surface coating, z-average diameters, zeta-potentials, aggregation behavior, ions release, and medium properties on the toxicity of SeNPs to algae P. malhamensi was investigated...

Effects of three nanomaterials on growth, photosynthetic characteristics and production of reactive oxygen species of diatom *Nitzschia Palea*

Authors: Cai Y, Mu WJ, Jia K et al.

Source: CHEMISTRY AND ECOLOGY Early Access, 2022, DOI 10.1080/02757540.2021.2023508

Abstract: Harmful effect of nanomaterials on aquatic organisms has accelerated in recent decades due to the growth emission of nanomaterials into water. In the present study, we analysed the toxic effects of TiO_2, ZnO and MWCTN on diatoms Nitzschia palea in both individual and a combined way. After a short-term (96 h) exposure, the changes of cell density, chlorophyll a, MDA, SOD, CAT, total protein content and morphological structure were determined...

The combined toxicity and mechanism of multi-walled carbon nanotubes and nano copper oxide toward freshwater algae: *Tetradesmus obliquus*

Authors: Fang R, Gong JL, Cao WC et al.

Source: JOURNAL OF ENVIRONMENTAL SCIENCES 112: 376-387, 2022, DOI 10.1016/j.jes.2021.05.0201001-0742

Abstract: Nanoparticles (NPs) are widely used for their special physical properties and released into the natural environment. When two types of NPs exist in the same environment, the presence of one type of NP may affect the properties of the other type of NP. This study investigated the toxic effects of multi-walled carbon nanotubes and copper oxide nanoparticles on Tetradesmus obliquus...

Toxicity of TiO_2 nanoparticles to the marine microalga *Chaetoceros muelleri* Lemmermann, 1898 under long-term exposure

Authors: Bameri L, Sourinejad I, Ghasemi Z, Fazelian N

Source: ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH Early Access, 2022, DOI 10.1007/s11356-021-17870-z

Abstract: Titanium dioxide nanoparticles (TiO_2NPs) have been extensively used in industry, raising many concerns about their release into the aquatic environments. In marine ecosystems, microalgae are major primary producers; among them, *Chaetoceros muelleri* is an important microalga in the aquaculture industry as live feed. The impacts of TiO_2NPs on the growth, photosynthetic pigments, protein and lipid contents, and the interaction of TiO_2NPs with the cell wall of *C. muelleri* were investigated in the present study. Algal cells were exposed to concentrations of 5, 10, 50, 100, 200, and 400 mg/L TiO_2NPs for 10 days...

Wastewater constituents impact biofilm microbial community in receiving streams

Authors: Tamminen M, Spaak J, Tlili A et al.

Source: SCIENCE OF THE TOTAL ENVIRONMENT 807: 151080, 2022, DOI 10.1016/j.scitotenv.2021.151080

Abstract: Microbial life in natural biofilms is dominated by prokaryotes and microscopic eukaryotes living in dense association. In stream ecosystems, microbial biofilms influence primary production, elemental cycles, food web interactions as well as water quality. Understanding how biofilm communities respond to anthropogenic impacts, such as wastewater treatment plant (WWTP) effluent, is important given the key role of biofilms in stream ecosystem function. Here, we implemented 16S and 18S rRNA gene sequencing of stream biofilms upstream (US) and downstream (DS) of WWTP effluents in four Swiss streams to test how bacterial and eukaryotic communities respond to wastewater constituents...

Integrated comparison of growth and oxidative stress induced by tylosin in two freshwater algae *Chlorella vulgaris* and *Raphidocelis subcapitata*

Authors: Lu DL, Ma ZH, Peng JL et al.

Source: ECOTOXICOLOGY Early Access, 2022, DOI 10.1007/s10646-021-02511-5

Abstract: Two model algae, *Chlorella vulgaris* (*C. vulgaris*) and *Raphidocelis subcapitata* (*R. subcapitata*), are commonly used in registration procedures to evaluate compounds with antimicrobial capacity. However, it has been found that these two algae show considerable differences in sensitivity when exposed to antibiotics. The selection of a suitable test species plays a crucial role in assessing the environmental hazards and risks of a compound, as the balance between oxidative stress and antioxidants is a key factor for alga growth. This study was conducted to investigate the status of oxidative stress and mechanism of antioxidant defense system of algae under antibiotic stress. Different tylosin exposure-concentrations were used for the tests in this study. Oxidative stress biomarkers (malondialdehyde), non-enzymatic antioxidants (reduced glutathione), antioxidant enzymes (superoxide dismutase, catalase, glutathione peroxidase, glutathione S-transferase) and photosynthetic pigments were measured to determine the status of the antioxidant defense system...

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A review on phorate persistence, toxicity and remediation by bacterial communities

Authors: Dar MA, Baba ZA, Kaushik G

Source: PEDOSPHERE 32: 171-183, 2022, DOI 10.1016/S1002-0160(21)60043-7

Abstract: Pesticides are an integral part in maintaining agriculture and horticultural productivity and play a vital role in meeting the increasing food, fiber, and fuel needs of the growing population. Globally, organophosphate pesticides (OPPs) are among the most common pesticides used due to their high proficiency and relatively low persistence in the environment. However, recent studies have reported problems due to pesticide use, e.g., phorate contamination of aquatic ecosystems (fresh and groundwater), sediments, fruits and vegetables, and forage crops. This review highlights many cases where phorate has been detected above its respective maximum residue limit values...

Insights into the ecotoxicity of nitrofurazone in marine ecosystems based on body-size spectra of periphytic ciliates

Authors: Kazmi SSU, Uroosa, Warren A et al.

Source: MARINE POLLUTION BULLETIN 174: 113217, 2022, DOI 10.1016/j.marpolbul.2021.113217

Abstract: In ecotoxicological studies, some biological responses known as biomarkers can be used as powerful tools to evaluate the ecotoxicity. In this study, we investigated the disparity of responses shown by body-size spectra of periphytic ciliate communities when used as biomarkers to detect the toxicity of the broad-spectrum veterinary antibiotic nitrofurazone. Briefly, in chronic exposure experiments ciliate communities were exposed to different concentrations (0, 1, 2, 4 and 8 mg/ml) of nitrofurazone...

Anthropogenic activities and seasonal properties jointly drive the assemblage of bacterial communities in subtropical river basins

Authors: Gao FZ, He LY, Hu LX et al.

Source: SCIENCE OF THE TOTAL ENVIRONMENT 806: 151476, 2022, DOI 10.1016/j.scitotenv.2021.151476

Abstract: Anthropogenic activities have inevitably impacted riverine ecosystems, yet their overall contribution to the assemblage of bacterial communities at a large river basin scale remains unclear. In this study, 16S amplicon sequencing was implemented to investigate the bacterial ecosystems in paired water and sediment of North River and West River basins in South China., which contains various anthropogenic environments (e.g., rural/ urban area, mining area and livestock area). Subsequently, the links between bacterial community and various types of emerging pollutants in river water were analyzed...

Investigation of the microbial community structure and diversity in the environment surrounding a veterinary antibiotic production factory

Authors: Miao JJ, Yin ZD, Yang YQ et al.

Source: RSC ADVANCES 12: 1021-1027, 2021, DOI 10.1039/d1ra08119e

Abstract: The ecological toxicity caused by antibiotic residues and resistance genes in the environment affects the community structures and activities of environmental microorganisms; the ecological toxicity effects of a long-term exposure to low doses antibiotic residues on microorganisms have not however been well-

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studied. In this work, sequence analysis and species annotation of the full-length 16S rRNA gene were carried out on the extracted whole genome by a 3-generation sequencing method to analyze the diversity of the microbial populations and the population differences among different sampling sites in the environment surrounding a veterinary antibiotic production factory...

Microbial adaptation to co-occurring vanadium and microplastics in marine and riverine environments

Authors: Yin WW, Zhang BG, Shi JX, Liu ZQ
Source: JOURNAL OF HAZARDOUS MATERIALS 424: 127646, 2022, DOI 10.1016/j.jhazmat.2021.127646

Abstract: Vanadium (V) and microplastics have been respectively detected in environmental media, posing threats to ecosystem and human health. However, their co-existence situations in environment with microbial adaptation have been poorly understood. In this study, water and sediments collected from potential V polluted marine and riverine ecosystems were analyzed to reveal the distribution of V and microplastics with microbial responses...

Legacy and Emerging Pollutants in an Urban River Stretch and Effects on the Bacterioplankton Community

Authors: Visca A, Caracciolo AB, Grenni P et al.

Source: WATER 13: 3402, 2021, DOI 10.3390/w13233402

Abstract: River contamination is due to a chemical mixture of point and diffuse pollution, which can compromise water quality. Polycyclic Aromatic Hydrocarbons (PAHs) and emerging compounds such as pharmaceuticals and antibiotics are frequently found in rivers flowing through big cities. This work evaluated the presence of fifteen priority PAHs, eight pharmaceuticals including the antibiotics ciprofloxacin and sulfamethoxazole, together with their main antibiotic resistant genes and the structure of the natural bacterioplankton community, in an urbanized stretch of the river Danube...

Rapid assessment of heavy metal-induced toxicity in water using micro-algal bioassay based on photosynthetic oxygen evolution

Authors: Hussain F, Eom H, Toor UA et al.

Source: ENVIRONMENTAL ENGINEERING RESEARCH 26: 200391, 2021, DOI 10.4491/eer.2020.391

Abstract: Toxicity assessment using microalgae adopted various endpoint measurements like mortality rate, photosynthetic activity, chlorophyll content, enzymatic activity, cell density, 14C assimilation, and phosphate uptake. These algal toxicity tests usually require 3-4 days of exposure time and laborious work to measure these endpoints parameters. In the present study, we described a simple and rapid toxicity assessment procedure using photosynthetic oxygen evolution as an endpoint measurement to determine heavy metal-induced toxicity. Oxygen evolution in gaseous phase was measured over a 12 h exposure time. The toxicity of six selected heavy metals was assessed...

Key Factors Governing Microbial Community in Extremely Acidic Mine Drainage (pH <3)

Authors: Huang Y, Li XT, Jiang Z et al.

Source: FRONTIERS IN MICROBIOLOGY 12: 761579, 2021, DOI 10.3389/fmicb.2021.761579

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Abstract: The microbial community of acid mine drainage (AMD) fascinates researchers by their adaption and roles in shaping the environment. Molecular surveys have recently helped to enhance the understanding of the distribution, adaption strategy, and ecological function of microbial communities in extreme AMD environments. However, the interactions between the environment and microbial community of extremely acidic AMD (pH < 3) from different mining areas kept unanswered questions. Here, we measured physicochemical parameters and profiled the microbial community of AMD collected from four mining areas with different mineral types to provide a better understanding of biogeochemical processes within the extremely acidic water environment...

ERA / PUBLICATIONS SCIENTIFIQUES / ECOTOXICOLOGIE SPATIALE / ECOTOXICOLOGIE DU PAYSAGE

The pesticide fate tool for groundwater vulnerability assessment within the geospatial decision support system LandSupport

Authors: Bancheri M, Fusco F, Dalla Torre D, Terribile F et al.

Source: Science of the Total Environment 807: 150793, 2022, https://doi.org/10.1016/j.scitotenv.2021.150793

Abstract: The protection of groundwater resources from non-point-source pollutants, such as those coming from agricultural practices, is the focus of several European Directives, including the Water Framework Directive and the Pesticide Directive. Besides the environmental goals to be reached by the single EU member state, these directives clearly underline the role of experts in supporting planners and public authorities to fulfil these objectives. This work presents a new web-based, freely-available dynamical tool, named the *pesticide fate tool*, developed within the geospatial Decision Support system (DSS), LandSupport, for the assessment of groundwater vulnerability, specific for type of pollutant. The tool is based on the extended transfer function model, specifically expanded to consider the transport of reactive solutes, such as pesticides...

Agricultural contaminants in amphibian breeding ponds: Occurrence, risk and correlation with agricultural land use

Authors: Goessens T, De Baere S, Deknock A, De Troyer N et al.

Source: Science of the Total Environment 806: 150661, 2022, DOI 10.1016/j.scitotenv.2021.150661

Abstract: Anthropogenic pressure such as agricultural pollution globally affects amphibian populations. In this study, a total of 178 different compounds from five agrochemical groups (i.e. antimicrobial drugs residues (ADRs), coccidiostats and anthelmintics, heavy metals, mycotoxins and pesticides) were determined monthly, from March until June 2019 in 26 amphibian breeding ponds in Flanders, Belgium. Furthermore, a possible correlation between the number and concentration of selected contaminants that were found and the percentage of arable land within a 200 m radius was studied...

https://dx.doi.org/10.17180/1ag1-9f08

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Bird exposure to fungicides through the consumption of treated seeds: A study of wild red-legged partridges in central Spain

Authors: Fernández-Vizcaíno E, Ortiz-Santaliestra ME, Fernández-Tizón M, Mateo R et al.

Source: Environmental Pollution 292: 118335, 2022, https://doi.org/10.1016/j.envpol.2021.118335

Abstract: Sown seeds are a key component of many farmland birds' diets due to natural food shortages in autumn and winter. Because these seeds are often treated with pesticides, their ingestion by birds can result in toxic effects. For risk assessment, data on treated seed toxicity should be combined with information about exposure risk for wild birds and the factors that modulate it. (...) We evaluated the influence of landscape composition on the intake of sown seeds and pesticides by partridges…

Direct pesticide exposure of insects in nature conservation areas in Germany

Authors: Brühl CA, Bakanov N, Köthe S, Eichler L et al.

Source: Scientific Reports 11(1): 1-10, 2021, https://doi.org/10.1038/s41598-021-03366-w

Abstract: In Germany, the decline of insect biomass was observed in nature conservation areas in agricultural landscapes. One of the main causal factors discussed is the use of synthetic pesticides in conventional agriculture. A drastic pesticide reduction in large buffers around nature conservation areas is necessary to avoid contamination of their insect fauna…

ERA / PUBLICATIONS SCIENTIFIQUES / MICROBIOLOGIE ET CONTAMINANTS

Dissolution Dynamics and Accumulation of Ag Nanoparticles in a Microcosm Consisting of a Soil-Lettuce-Rhizosphere Bacterial Community

Authors: Wu J, Zhai YJ, Liu G and more...

Source: ACS Sustainable Chemistry & Ingineering 9, 48: 16172-16181, 2021, DOI 10.1021/acssuschemeng.1c04987

Abstract: Assessment of chronic impact of metallic nanoparticles (NPs) in soil ecosystems is a necessity for ensuring safe and sustainable application. NPs affect plants and their associated microbial life, while the plants and their associated microbiota affect the NPs' fate. Here, we measured the available Ag pool (determined as diethylenetriaminepentaacetic acid-extractable Ag) in AgNP-amended sandy loam soil (1, 10, and 50 mg Ag per kg of soil) over a period of 63 d with and without lettuce...

Integrative analyses of geochemical parameters-microbe interactions reveal the variation of bacterial community assembly in multiple metal(loid)s contaminated arable regions

Authors: Liu HK, Wei MY, Huang HY and more...

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Source: Environmental Research 208, 2022, DOI 10.1016/j.envres.2021.112621

Abstract: Soil microbes play crucial roles in biochemical and geochemical processes in contaminated arable ecosystems. However, what factors determine the assembling process of soil bacterial community under multiple heavy metal (loid)s (HMs) stress and how communities respond to geochemical changes have rarely been understood. Therefore, a number of contaminated soils were sampled to explore the interactions among geochemical parameters, HMs and innate bacterial community...

Assembly of root-associated bacterial community in cadmium contaminated soil following five-year consecutive application of soil amendments: Evidences for improved soil health

Authors: Cheng ZY, Shi JC, He Y and more...

Source: Journal of Hazardous Materials 426, 2022, DOI 10.1016/j.jhazmat.2021.128095

Abstract: Soil amendments have been extensively used to remediate heavy metal contaminated soils by immobilizing or altering edaphic properties to reduce the bioavailability of heavy metals. However, the potential influences of long-term soil amendments applications on microbial communities and polluted soil health are still in its infancy despite that have been applied for decades. We used amplicon sequencing and q-PCR array to characterize the root-associated microbial community compositions and rhizosphere functional genes in a five-year field experiment with consecutive application of four amendments (lime, biochar, pig manure, and a commercial Mg-Ca-Si conditioner)...

Effect of the Nanoparticle Exposures on the Tomato Bacterial Wilt Disease Control by Modulating the Rhizosphere Bacterial Community

Authors: Jiang HB, Lv LQ, Ahmed T and more...

Source: International Journal of Molecular Sciences 23(1): 414, 2022, DOI 10.3390/ijms23010414

Abstract: *Ralstonia Solanacearum* is one of the most infectious soil-borne bacterial plant pathogens, causing tomato bacterial wilt (TBW). Nanotechnology is an emerging area of research, particularly the application of nanoparticles (NPs) as nanopesticides to manage plant disease is gaining attention nowadays. However, the interaction between NPs and rhizosphere bacterial communities remains largely elusive. This study indicated that metal NPs (CuO, ZnO, and FeO) reduced the incidence of bacterial wilt to varying degrees and affected the composition and structure of the rhizosphere bacterial community...

Responses of Bacterial Taxonomical Diversity Indicators to Pollutant Loadings in Experimental Wetland Microcosms

Authors: Roy SG, Wimpee CF, McGuire SA, Ehlinger TJ

Source: Water 14(2): 251, 2022, DOI 10.3390/w14020251

Abstract: Urbanization results in higher stormwater loadings of pollutants such as metals and nutrients into surface waters. This directly impacts organisms in aquatic ecosystems, including microbes. Sediment microbes are known for pollution reduction in the face of contamination, making bacterial communities an

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important area for bioindicator research. This study explores the pattern of bacterial responses to metal and nutrient pollution loading and seeks to evaluate whether bacterial indicators can be effective as a biomonitoring risk assessment tool for wetland ecosystems...

Regulative effect of imazethapyr on *Arabidopsis thaliana* growth and rhizosphere microbial community through multiple generations of culture

Authors: Zheng BY, Zhao QQ, Feng L and more...

Source: Plant and Soil, 2022, DOI 10.1007/s11104-022-05318-3

Abstract: Background and aims Imazethapyr (IM) is a chiral herbicide with two enantiomers, with a much stronger herbicidal effect of R-IM than S-IM. Pesticide residues are a common problem, and multi-generation cultivation method can reveal the consequences of long-term pesticide residues. Methods This study verified the effects of R-IM on the growth of *Arabidopsis thaliana* and rhizosphere microorganisms by treating A. thaliana with different concentrations of R-IM successively passaging experimental rhizospheres for three generations, and measured the changes of A. thaliana rhizosphere microbes...

Metagenomic analysis reveals the response of microbial community in river sediment to accidental antimony contamination

Authors: Chen XL, Wang J, Pan CY and more...

Source: Science of the Total Environement 813, 2022, DOI 10.1016/j.scitotenv.2021.152484

Abstract: The mining of deposits containing metals like antimony (Sb) causes serious environmental issues that threaten human health and ecological systems. However, information on the effect of Sb on freshwater sediment microorganisms and the mechanism of microbial Sb resistance is still very limited. This was the first attempt to explore microbial communities in river sediments impacted by accidental Sb spill...

Changes in Bacterial and Fungal Community of Soil under Treatment of Pesticides

Authors: Streletskii R, Astaykina A, Krasnov G, Gorbatov V

Source: Agronomy-Basel 12, 1, 2022, DOI 10.3390/agronomy12010124

Abstract: Experiments were carried out in soil microcosms with the treatment of pesticide formulations-imidacloprid, benomyl, and metribuzin in single and tenfold application rates. For additional stimulation of microorganisms, a starch-mineral mixture was added to some variants. For all samples, high-throughput sequencing on the Illumina MiSeq platform of the V4 (16S rRNA) and ITS1 (18S rRNA) fragments was carried out...

Effects of Elevation and Distance from Highway on the Abundance and Community Structure of Bacteria in Soil along Qinghai-Tibet Highway

Authors: Liu ZC, Yang YG, Ji SX and more...

Source: International Journal of Environmental Research and Public health 18, 24, 2022, DOI 10.3390/ijerph182413137

Abstract: In recent years, highway construction in the Qinghai-Tibet Plateau (QTP) has developed rapidly. When the highway passes through grassland, the soil, vegetation, and ecological environment along the line are disturbed.

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However, the impact on soil bacteria is still unclear...

Relationships between microbial activity, enzyme activities and metal(loid) form in NiCu tailings area

Authors: Li H, Yao J, Min N and more...

Source: Science of The Total Environment 812, 2022, DOI 10.1016/j.scitotenv.2021.152326

Abstract: Here we combined microcalorimetry, enzyme activity measurements, and characterization of metal form in order to evaluate the effect of metal(loid)s on the activity of microbial community inhabiting tailings area with high toxic metal(loid)s concentration. Chromium (Cr), nickel (Ni), copper (Cu) and manganese (Mn) were the main pollutants...

Nano agrochemical zinc oxide influences microbial activity, carbon, and nitrogen cycling of applied manures in the soil-plant system

Authors: Shah GM, Ali H, Ahmad I and more...

Source : Environmental Pollution 293, 2022, DOI 10.1016/j.envpol.2021.118559

Abstract: The widespread use of nano-enabled agrochemicals in agriculture for remediating soil and improving nutrient use efficiency of organic and chemical fertilizers is increasing continuously with limited understanding on their potential risks. Recent studies suggested that nanoparticles (NPs) are harmful to soil organisms and their stimulated nutrient cycling in agriculture...

Effects of chiral herbicide dichlorprop on *Arabidopsis thaliana* metabolic profile and its implications for microbial communities in the phyllosphere

Authors: Qiu DY, Ye YZ, Ke MJ and more...

Source: Environmental Science and Pollution Research 2022, DOI 10.1007/s11356-021-17936-y

Abstract: Dichlorprop (2-(2,4-dichlorophenoxy) propionic acid, DCPP), a commonly used herbicide for weed control, can be residually detected in soil. It is still unclear whether chiral DCPP exerts an enantioselective adverse effect on plant metabolism and the microbial community of the phyllosphere. In this study, we selected Arabidopsis thaliana as a model plant to explore the effects of R- and S-DCPP enantiomers on plant physiological activities, metabolism, and associated changes in the phyllosphere microbial community...

Effects of atrazine on soil microbial indicators and the evaluation of herbicide attenuation in microcosms

Authors: Serafini CG, Clerici NJ, Della-Flora I and more...

Source: Journal of Soils and Sediments 2022, DOI 10.1007/s11368-021-03121-8

Abstract: Purpose Soil microbiota performs essential functions related to soil functioning and quality. Atrazine is a widely used herbicide, presenting potential risks to (agro)ecosystems. Thus, we aimed to investigate the effects of atrazine towards microbial indicators, as well as to assess herbicide attenuation in soil microcosms...

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Structure and diversity of fungal communities in long-term copper-contaminated agricultural soil

Authors: Zhang XM, Fu GX, Xing, SP and more...

Source: Science of the Total Environement 806(3), 2022, DOI 10.1016/j.scitotenv.2021.151302

Abstract: Copper (Cu) contamination threatens the stability of soil ecosystems. As important moderators of biochemical processes and soil remediation, the fungal community in contaminated soils has attracted much research interest. In this study, soil fungal diversity and community composition under long-term Cu contamination were investigated based on high-throughput sequencing. The co-occurrence networks were also constructed to display the co-occurrence patterns of the soil fungal community...

The response of bacterial communities to V and Cr and novel reducing bacteria near a vanadium-titanium magnetite refinery

Authors: Tang X, Huang Y, Li Yi and more...

Source: Science of the Total Environement 806(3), 2022, DOI 10.1016/j.scitotenv.2021.151214

Abstract: Soil contamination with multiple heavy metals has always been a pressing issue, but little attention has been given to V and Cr and their chemical fractions' impacts on microorganisms because Cr_2O_3 usually occurs as an associated mineral in vanadium mines...

Effects of Nanoformulated Plant Growth Regulator on Culturable Bacterial Population, Microbial Biomass and Enzyme Activities in Two Soil Types

Authors: Basay CP, Paterno ES, Delmo-Organo N and more...

Source: MINDANAO JOURNAL OF SCIENCE AND TECHNOLOGY 19(2):145-163, 2022

Abstract: Nanomaterials have many beneficial applications; however, their impacts on the environment necessitate an assessment. Understanding any possible negative effects of nano-based products on soil health needs to be performed before their extensive use in crop production and commercialization. Microorganisms are considered the most sensitive indicators of environmental stresses. Thus, this study assessed the effects of nanoformulated plant growth regulator (HormoGroe (R)) on the culturable soil bacterial population, dehydrogenase (DHA) and unease (UA) activities, and microbial biomass (MCB) in Lipa clay loam (LCL) and Sariaya sandy loam (SSL)...

Influence of heavy metals on the occurrence of Antarctic soil microalgae

Authors: Dang NL, Chu WL, Yap KSI and more...

Source: Antartic Science 2021, DOI 10.1017/S0954102021000390

Abstract: Human- and animal-impacted sites in Antarctica can be contaminated with heavy metals, as well as areas influenced by underlying geology and naturally occurring minerals. The present study examined the relationship between heavy metal presence and soil microalgal occurrence across a range of human-impacted and undisturbed locations on Signy Island...

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Metagenomic Analysis for Evaluating Change in Bacterial Diversity in TPH-Contaminated Soil after Soil Remediation

Authors: Kim JW, Hong YK, Kim HS and more...

Source: Toxics 9(12): 319, 2021, DOI 10.3390/toxics9120319

Abstract: Soil washing and landfarming processes are widely used to remediate total petroleum hydrocarbon (TPH)-contaminated soil, but the impact of these processes on soil bacteria is not well understood. Four different states of soil (uncontaminated soil (control), TPH-contaminated soil (CS), after soil washing (SW), and landfarming (LF)) were collected from a soil remediation facility to investigate the impact of TPH and soil remediation processes on soil bacterial populations...

Ecological responses of bacterial assembly and functions to steep Cd gradient in a typical Cd-contaminated farmland ecosystem

Authors: Deng Y, Fu SD, Sarkodie EK and more...

Source: Ecotoxicology and Environmental Safety 229, 2022, DOI 10.1016/j.ecoenv.2021.113067

Abstract: The response of soil bacterial communities from farmland ecosystems to cadmium (Cd) pollution, in which a steep concentration gradient of more than 100 mg/kg has naturally formed, has not previously been fully reported. In this study, a field investigation was conducted in a typical severe Cd-polluted farmland ecosystem...

Fate of heavy metals and bacterial community composition following biogas slurry application in a single rice cropping system

Authors: Wang Q, Chen ZM, Zhao J and more...

Source: Journal of Soils and sediments 2022, DOI 10.1007/s11368-021-03117-4

Abstract: Purpose Biogas slurry (BS) is widely used as a valuable fertilizer for crop production. However, little is known about the effects of long-term BS application on potential pollution risk of heavy metals and bacterial community in paddy field. This study aimed to determine the accumulation and rice plant uptake of heavy metals (Cd, Cr, Pb, Cu, and Zn), as well as soil bacterial community composition following repeated BS application in a single rice cropping system...

Biogeography, assembly processes and species coexistence patterns of microbial communities in metalloids-laden soils around mining and smelting sites

Authors: Bang L, Jun Y, Chen ZH and more...

Source: Journal of Hazardous Materials 425, 2022, DOI 10.1016/j.jhazmat.2021.127945

Abstract: Microbes are important component in terrestrial ecosystem, which are believed to play vital roles in biogeochemical cycles of metalloids in mining and smelting surroundings. Many studies on microbial diversity and structures have been investigated around mining and smelting sites, whereas the ecological processes and cooccurrence patterns that influence the biogeographic distributions of microbial communities is yet poorly understood...

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Effects of copper oxide nanoparticles on Salix growth, soil enzyme activity and microbial community composition in a wetland mesocosm

Authors: Qu HJ, Ma CX, Xing WL and more...

Source: Journal of Hazardous Materials 424, D, 2022, DOI 10.1016/j.jhazmat.2021.127676

Abstract: A model wetland with Salix was established to investigate the effects of CuO nanoparticles (NPs; the equivalent amount of Cu at 0, 100 and 500 mg/kg) on plant, soil enzyme activity and microbial community. Ionic Cu (100, 500 mg/kg) and bulk-sized CuO particles (BPs, 500 mg/kg) were included as controls...

Microscopic Fungi in Big Cities: Biodiversity, Source, and Relation to Pollution by Potentially Toxic Metals

Authors: Korneykova MV, Soshina AS, Novikov AI and more...

Source: Atmosphere 12, 11, 2021, DOI 10.3390/atmos12111471

Abstract: For the first time, a mycological analysis of outdoor urban environment (air, leaves, sealed surfaces) was carried in the cities of subarctic (Murmansk) and temperate (Moscow) climatic zones. The chemical composition of dust deposited on leaves of dominant tree species was taken as an indicator of the air quality. Assessment of the complex impact of factors (climate zone, type of substrate, anthropogenic load) on the quantitative and qualitative parameters of mycobiome was performed...

Fungicide effects on human fungal pathogens: Cross-resistance to medical drugs and beyond

Authors: Bastos RW, Rossato L, Goldman GH, Santos DA

Source: PLOS Pathogens 17, 12, 2021, DOI 10.1371/journal.ppat.1010073

Abstract: Fungal infections are underestimated threats that affect over 1 billion people, and Candida spp., Cryptococcus spp., and Aspergillus spp. are the 3 most fatal fungi. The treatment of these infections is performed with a limited arsenal of antifungal drugs, and the class of the azoles is the most used. Although these drugs present low toxicity for the host, there is an emergence of therapeutic failure due to azole resistance. Drug resistance normally develops in patients undergoing azole long-term therapy, when the fungus in contact with the drug can adapt and survive. Conversely, several reports have been showing that resistant isolates are also recovered from patients with no prior history of azole therapy, suggesting that other routes might be driving antifungal resistance. Intriguingly, antifungal resistance also happens in the environment since resistant strains have been isolated from plant materials, soil, decomposing matter, and compost, where important human fungal pathogens live...

Different dissolved organic matters regulate the bioavailability of heavy metals and rhizosphere microbial activity in a plant-wetland soil system

Auhors: Li YH, Gong XF, Xiong JQ and more...

Source: Journal of Environmental Chemical Engineering 9, 6, 2021, DOI 10.1016/j.jece.2021.106823

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Abstract: Dissolved organic matter (DOM) and hydrologic conditions significantly influences the migration and transformation of heavy metals, especially in wetland soil. However, there still remains challenge in understanding how the DOM from different sources regulates the bioavailability of heavy metals, enzyme activity and microbial activity...

Litter Decomposition of *Imperata cylindrica* in a Copper Tailing Areas With Different Restoration History: Fungal Community Dynamics and Driving Factors

Authors: Jia T, Wang XR, Guo TY, Chai BF

Source: Frontiers in Microbiology 12, 2021, DOI 10.3389/fmicb.2021.780015

Abstract: Microorganisms drive litter decomposition while maintaining the chemical cycle of ecosystems. We used the dominant vegetation (*Imperata cylindrica*) in the mining area selected for this study for this experiment to explore fungal community characteristics, key fungal groups, and their associative driving factors during *I. cylindrica* litter decomposition...

Molecular Characterization of Distinct Fungal Communities in the Soil of a Rare Earth Mining Area

Authors: Liu JJ, Li C, Ma WD and more...

Source: Microbial Ecology 2022, DOI 10.1007/s00248-021-01931-4

Abstract: The exploitation of ion-absorbed rare earth elements (REEs) has caused serious ecological destruction and environmental pollution. Effects on soil fungal structure and diversity exerted by mining activities are usually ignored, although fungus is one of the most important components in soil ecosystems...

Uranium(VI) bioassociation by different fungi - a comparative study into molecular processes

Authors: Wollenberg A, Kretzschmar J, Drobot B and more...

Source: Journal of Hazardous Materials 411, 2021, DOI10.1016/j.jhazmat.2021.125068

Abstract: After the Chernobyl and Fukushima incidents it has become clear that fungi can take up and accumulate large quantities of radionuclides and heavy metals, but the underlying processes are not well understood yet. For this study, the molecular interactions of uranium(VI) with the white-rot fungi, Schizophyllum commune and Pleurotus ostreatus , and the soil-living fungus, *Leucoagaricus naucinus*, were investigated...

Estimation of baseline levels of bacterial community tolerance to Cr, Ni, Pb, and Zn in unpolluted soils, a background for PICT (pollution-induced community tolerance) determination

Authors: Campillo-Cora, C, Soto-Gomez, D, Arias-Estevez, M, Baath, E et al.

Source: Biology and Fertility of Soils 2022, DOI 10.1007/s00374-021-01604-x

Abstract: The PICT method (pollution-induced community tolerance) can be used to assess whether changes in soil microbial response are due to heavy metal toxicity or not. Microbial community tolerance baseline levels can, however, also change due to variations in soil physicochemical properties...

https://dx.doi.org/10.17180/1ag1-9f08
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Excess copper promotes catabolic activity of gram-positive bacteria and resistance of gram-negative bacteria but inhibits fungal community in soil

Authors: Yang MK, Liu YA, Liao YH and more...

Source: Environmental Science and Pollution Research 2022, DOI 10.1007/s11356-021-17510-6

Abstract: The extensive use of copper fungicides has resulted in significant non-target effects on soil microbial communities. However, the documented effects are often variable and contradictory, depending on the methods used to assess them. In this study, we examined the effects of copper accumulation in surface soils on microbial catabolic activity, active biomass and composition, and sensitive bacterial species...

ERA / PUBLICATIONS SCIENTIFIQUES / MICROBIOLOGIE ET CONTAMINANTS / Antibiotiques et antibiorésistances

Strong and widespread cycloheximide resistance in Stichococcus-like eukaryotic algal taxa

Authors: Syuhada NH, Merican F, Zaki S and more...

Source: Scientific Reports 12, 1, 2022, DOI 10.1038/s41598-022-05116-y

Abstract This study was initiated following the serendipitous discovery of a unialgal culture of a Stichococcus-like green alga (Chlorophyta) newly isolated from soil collected on Signy Island (maritime Antarctica) in growth medium supplemented with 100 mµg/mL cycloheximide (CHX, a widely used antibiotic active against most eukaryotes).../...Both phylogenetic and CHX sensitivity analyses suggest that CHX resistance is potentially widespread within this group of algae.

Veterinary antibiotics can reduce crop yields by modifying soil bacterial community and earthworm population in agro-ecosystems

Authors: Zhao FK, Yang L, Li G and more...

Source: Science of the Total Environment 808, 2022, DOI 10.1016/j.scitotenv.2021.152056

Abstract: Veterinary antibiotics are intensively and widely used in animal farming to treat or prevent diseases, as well as improve growth rate and feed efficiency. Animal manure is an important reservoir of veterinary antibiotics due to their high excretion rates, and thus manure application has been a critical source of veterinary antibiotics in agro-ecosystems. However, how veterinary antibiotics affect agroecosystem functions is still unclearly understood. In this study, we evaluated the effects of veterinary antibiotics on soil bacteria and earthworms in agricultural land with long-term manure application...

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Strategies to Control Human Health Risks Arising from Antibiotics in the Environment: Molecular Modification of QNs for Enhanced Plant-Microbial Synergistic Degradation

Authors: Sun PX, Zhao WJ

Source: International Journal of Environmental Research and Public Health 8, 20, 2021, DOI 10.3390/ijerph182010610

Abstract: In the present work, a comprehensive screening and evaluation system was established to improve the plant-microbial synergistic degradation effects of QNs. The study included the construction of a 3D-QSAR model, the molecular modification, environmental friendliness and functional evaluation of drugs, degradation pathway simulation, and human health risk assessment...

Isolation, characterization and degradation performance of oxytetracycline degrading bacterium *Planococcus* sp. strain pw2

Authors: Suruttaiyan S, Duraisamy P, Krishnaraj S and more...

Source: Arcives of Microbiology 204, 2, 2022, DOI 10.1007/s00203-021-02732-6

Abstract Oxytetracycline (OTC), is a widely used veterinary antibiotic for treatment and prophylaxis in aquaculture. As an emerging pollutant, OTC in the environment exerts selective pressure on aquatic organisms causing proliferation of antibiotic resistant genes. In the present study, an OTC tolerant isolate labelled as pw2 was selected among the 11 OTC tolerant isolates, isolated from the aquaculture effluent, for investigating its OTC degrading potential...

Antimicrobial agents and microbial ecology

Authors: Di Martino P

Source: AIMS MICROBIOLOGY 8(1): 1-4, 2022, DOI 10.3934/microbiol.2022001

Abstract: Antimicrobials are therapeutic substances used to prevent or treat infections. Disinfectants are antimicrobial agents applied to non-living surfaces. Every year, several thousand tonnes of antimicrobials and their by-products are released into the environment and in particular into the aquatic environment. This type of xenobiotic has ecological consequences in the natural environment but also in technological environments...

Metabolic responses of indigenous bacteria in chicken faeces and maggots to multiple antibiotics via heavy water labeled single-cell Raman spectroscopy

Authors: Olaniyi OO, Li HZ, Zhu YG, Cui L

Source: Journal of Environmental Sciences 113: 394-402, 2022, DOI 10.1016/j.jes.2021.06.024

Abstract: The use of maggots derived from chicken faeces as fish diets might serve as a vehicle for the widespread of multiple antibiotic resistant bacteria (ARB) in the environment. Heavy water labeled single-cell Raman spectroscopy (D_2O-Raman) was applied to detect the metabolic responses of indigenous bacteria in chicken faeces and maggots to different concentrations of combined colistin, kanamycin, and vancomycin...

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Investigation of the microbial community structure and diversity in the environment surrounding a veterinary antibiotic production factory

Authors: Miao JJ, Yin ZD, Yang YQ and more...

Source: RSC Advances 12(2): 1021-1027, 2021, DOI 10.1039/d1ra08119e

Abstract: The ecological toxicity caused by antibiotic residues and resistance genes in the environment affects the community structures and activities of environmental microorganisms; the ecological toxicity effects of a long-term exposure to low doses antibiotic residues on microorganisms have not however been well-studied. In this work, sequence analysis and species annotation of the full-length 16S rRNA gene were carried out on the extracted whole genome by a 3-generation sequencing method to analyze the diversity of the microbial populations and the population differences among different sampling sites in the environment surrounding a veterinary antibiotic production factory...

Antibiotic tolerance and degradation capacity of the organic pollutant-degrading bacterium *Rhodococcus biphenylivorans* TG9T

Authors: Yu CG, Armengaud J, Blaustein RA and more...

Source: Journal of Hazardous Materials 424, D, 2022, DOI 10.1016/j.jhazmat.2021.127712

Abstract: Antibiotics are ubiquitous in soil due to natural ecological competition, as well as emerging contaminants due to anthropogenic inputs. Under environmental factors like antibiotic stress, some bacteria, including those that degrade environmental pollutants, can enter a dormant state as a survival strategy, thereby limiting their metabolic activity and function. Dormancy has a critical influence on the degradative activity of bacteria, dramatically decreasing the rate at which they transform organic pollutants...

Efficient biodegradation of chlortetracycline in high concentration from strong-acidity pharmaceutical residue with degrading fungi

Authors: Li YJ, Chen HB, Wang YZ and more...

Source: Journal of Hazardous Materials 424, D, 2022, DOI 10.1016/j.jhazmat.2021.127671

Abstract: Chlortetracycline (CTC) pharmaceutical residue with strong acidity and in high CTC concentration is a hazardous solid waste. There is a huge attention but few studies on whether and how the CTC raw residue (CRR) can be degraded in microbiological way. In this study, three self-screened fungi, LJ245, LJ302 and LJ318, were used and thoroughly investigated to remove CTC, strong acidity and biotoxicity in CRR...

Sources of Antibiotic Resistant Bacteria (ARB) and Antibiotic Resistance Genes (ARGs) in the Soil: A Review of the Spreading Mechanism and Human Health Risks

Authors: Ondon BS, Li SN, Zhou QiX and more...

Source: Book Series Reviews of Environmental Contamination and Toxicology 256: 121-153, 2021, DOI 10.1007/398_2020_60

Abstract: Soil is an essential part of our ecosystem and plays a crucial role as a nutrient source, provides habitat for plants and other organisms. Overuse of antibiotics has accelerated the development and dissemination of antibiotic resistant bacteria (ARB) and antibiotic resistance genes (ARGs). ARB and ARGs are recognized as

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emerging environmental contaminants causing soil pollution and serious risks to public health...

Impact of antibiotics as anthropogenic stressor for influencing bacterial evolutionary process - A review

Author: Ghosh S

Source: ECOLOGICAL QUESTIONS 32(2): 9-58, 2021, DOI 10.12775/EQ.2021.013

Abstract: A large number of human induced stressors are affecting natural evolutionary process through altering ecosystems and biodiversity. Antibiotics are one of the most commonly excreted pollutants released in environment since last eight decades. Antibiotics can alter genetic orientation of bacterial population and can exert selection pressure for emerging new taxon. In environments like soil and water, antibiotics directly or indirectly may affect many aspects of natural systems like biogeochemical cycles, nitrifications and decomposition process. All these may bring new selection pressure for bacteria not only in community or population level but also in species level.

Cadmium enhances conjugative plasmid transfer to a fresh water microbial community

Authors: Pu Q, Fan XT, Li H and more...

Source : Environmental Pollution 268, B, 2021, DOI 10.1016/j.envpol.2020.115903

Abstract: Co-selection of antibiotic resistance genes (ARGs) by heavy metals might facilitate the spread of ARGs in the environments. Cadmium contamination is ubiquitous, while, it remains unknown the extent to which cadmium (Cd^{2+}) impact plasmid-mediated transfer of ARGs in aquatic bacterial communities. In the present study, we found that Cd2+ amendment at sub-inhibitory concentration significantly increased conjugation frequency of RP4 plasmid from Pseudomonas putida KT2442 to a fresh water microbial community...

Disentangling the Effects of Physicochemical, Genetic, and Microbial Properties on Phase-Driven Resistome Dynamics during Multiple Manure Composting Processes

Authors: Wang C, Zhu WJ, Strong PJ and more...

Source: Environmental Science & Technology 55(21): 14732-14745, 2021, DOI 10.1021/acs.est.1c03933

Abstract: Composting alters manure-derived antibiotic resistance genes (ARGs) to a certain extent, which is largely dependent upon the composting phase, manure type, microbial phylogeny, and physicochemical properties. However, little is known about how these determinants influence the fate and dynamics of ARGs as well as the mechanisms underlying the ecological process of ARGs during composting. Here, we investigated the temporal patterns of ARGs and their correlations with a series of physicochemical, genetic, and microbial properties during pilot-scale composting of chicken, maggot, bovine, and swine manure...

https://dx.doi.org/10.17180/1ag1-9f08

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ERA / PUBLICATIONS SCIENTIFIQUES / MICROBIOLOGIE ET CONTAMINANTS / Biocontrôle

Plant metabolomics to the benefit of crop protection and growth stimulation

Authors: Bertrand C, Gonzalez-Coloma A, Prigent-Combaret C

Source: PLANT METABOLOMICS IN FULL SWING, Book SeriesAdvances in Botanical Research, 98: 107-132, 2022, DOI 10.1016/bs.abr.2020.11.002, edited by Petriacq P, Bouchereau A

Abstract: Biotic and abiotic stresses strongly affect plant growth, quality of production and crop yield. Respectively biocontrol products and biostimulants have been proposed as agronomic tools to counteract those stresses. Research and development on biocontrol and biostimulant products require the study and characterization of the biotic and abiotic interactions involved in these processes. Plant metabolomics approach plays a key role in the identification of chemical mediators involved in these two types of interactions. Metabolomics is a useful tool for the characterization of volatile organic compounds (VOCs) involved in plant-insect interactions, or for the bioguided identification of active compounds from new raw materials…

ERA / PUBLICATIONS SCIENTIFIQUES / MICROBIOLOGIE ET CONTAMINANTS / Bioremédiation

Impacts of earthworm casts on atrazine catabolism and bacterial community structure in laterite soil

Authors: Luo SW, Ren L, Wu WJ and more...

Source: Journal of Hazardous Materials 425, 2022, DOI 10.1016/j.jhazmat.2021.127778

Abstract: Atrazine accumulation in agricultural soil is prone to cause serious environmental problems and pose risks to human health. Vermicomposting is an eco-friendly approach to accelerating atrazine biodegradation, but the roles of earthworm cast in the accelerated atrazine removal remains unclear...

The association between *Pinus halepensis* and the Ectomycorrhizal fungus Scleroderma enhanced the phytoremediation of a polymetal-contaminated soil

Authors: Ouatiki E, Midhat L, Tounsi A and more...

Source: International Journal of Environmental Science and technology 2022, DOI 10.1007/s13762-022-03993-4

Abstract: The present paper aims to study the phytoremediation of a polymetallic abandoned mine site in the northwest of Marrakesh, Morocco, by exploring the potential of the symbiotic

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relationship between Pinus halepensis and the ectomycorrhizal fungi belonging to the Scleroderma genus. This process was combined with the use of sand to neutralize the acidic mine tailings (pH < 3) and to stabilize the heavy metals...

Arbuscular mycorrhizal fungi reverse selenium stress in Zea mays seedlings by improving plant and soil characteristics

Authors: Sun CY, Yang YS, Zeeshan M and more...

Source: Ecotoxicology and Environemental Safety 228, 2021, DOI 10.1016/j.ecoenv.2021.113000

Abstract: Selenium (Se) is a beneficial trace element for certain animals including humans, while remaining controversial for plants. High Se concentration in soil is toxic to plants especially at seedling stage of the plants. Although, arbuscular mycorrhizal fungi (AMF) are important for plant stress resistance; but the mechanisms by which AMF alleviate Se stress in crop seedlings are unclear...

Rapid degradation of the sulfonylurea herbicide-chlorimuron-ethyl by three novel strains of fungi

Authors: Wand X, Zhang YA, Bao J

Source: Bioremediation Journal 2022, DOI 10.1080/10889868.2022.2029822

Abstract: Chlorimuron-ethyl is a sulfonylurea herbicide with broad-spectrum weed control characteristics, low utilization rate, relatively high persistence in the soil. Chlorimuron-ethyl has been widely used world-over, and strategies for its removal have attracted increasing attention. Microbial degradation is considered the most acceptable dissipation method. We obtained the best biodegradation conditions using response surface methodology...

Factors Influencing the Bacterial Bioremediation of Hydrocarbon Contaminants in the Soil: Mechanisms and Impacts

Authors: Kebede G, Tafese T, Abda EM and more...

Source: Journal of Chemistry 2021, 2021, DOI 10.1155/2021/9823362

Abstract: review: The discharge of hydrocarbons and their derivatives to environments due to human and/or natural activities cause environmental pollution (soil, water, and air) and affect the natural functioning of an ecosystem. To minimize or eradicate environmental pollution by hydrocarbon contaminants, studies showed strategies including physical, chemical, and biological approaches. Among those strategies, the use of biological techniques (especially bacterial biodegradation) is critically important to remove hydrocarbon contaminants...

Remediation mechanism of "double-resistant" bacteria-*Sedum alfredii* Hance on Pb- and Cd-contaminated soil

Authors: Mo TD, Jiang DH, Shi DD and more...

Source: Ecological Processes 11, 1, 2022, DOI 10.1186/s13717-021-00347-9

Abstract: Background Concentrations of heavy metals continue to increase in soil environments as a result of both anthropogenic activities and natural processes. Cadmium (Cd) and lead (Pb) is one of the most toxic heavy metals and pose health risks to both humans and the ecosystem. Therefore, effectively solving the problem of heavy metal pollution is the concern of soil workers. Among the existing remediation techniques, only the combined use of microorganisms and plants for remediation of heavy metal-contaminated soil is the greenest and most developed one...

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Deciphering Cadmium (Cd) Tolerance in Newly Isolated Bacterial Strain, *Ochrobactrum intermedium* BB12, and Its Role in Alleviation of Cd Stress in Spinach Plant (*Spinacia oleracea* L.)

Authors: Renu S, Sarim KM, Singh DP and more...

Source: Frontiers in Microbiology 12, 2022, DOI 10.3389/fmicb.2021.758144

Abstract: A cadmium (Cd)-tolerant bacterium *Ochrobactrum intermedium* BB12 was isolated from sewage waste collected from the municipal sewage dumping site of Bhopal, India. The bacterium showed multiple heavy metal tolerance ability and had the highest minimum inhibitory concentration of 150 mg L-1 of Cd. Growth kinetics, biosorption, scanning electron microscopy (SEM), transmission electron microscopy (TEM), and Fourier transform infrared (FTIR) spectroscopy studies on BB12 in the presence of Cd suggested biosorption as primary mode of interaction...

Effective immobilization of heavy metals via reactive barrier by rhizosphere bacteria and their biofilms

Authors: Xing YH Tan SX, Liu S and more...

Source: Environemental Research 207, 2022, DOI 10.1016/j.envres.2021.112080

Abstract: As the portal of plants, rhizosphere microorganisms play an essential role in controlling the species, transformation, and bioavailability of heavy metals, yet the potential passivation mechanism is still unclear. In this study, two heavy metal resistant and growth-promoting rhizosphere bacteria were screened, and their mechanisms in dealing with external stress and immobilizing heavy metal were explored...

Mixed bacteria-loaded biochar for the immobilization of arsenic, lead, and cadmium in a polluted soil system: Effects and mechanisms

Authors: Ji XW, Wan J, Wang XD and more...

Source: Science of the Total Environement 811, 2022, DOI 10.1016/j.scitotenv.2021.152112

Abstract: The present study explored the immobilization of mixed bacteria-loaded biochar on As, Pb, and Cd was explored. Physisorption and sodium alginate encapsulation were used to synthesize two kinds of mixed bacteria-loaded biochars, referred to as BCM and BCB. The observations of Scanning electron microscope, X-ray diffraction, and Fourier transform infrared spectroscopy distinctly demonstrated the colonization of mixed bacteria on biochar...

Rhizobium Inoculation Enhances the Resistance of Alfalfa and Microbial Characteristics in Copper-Contaminated Soil

Authors: Duan CJ, Mei YX, Wang Q and more...

Source: Frontiers in Microbiology 12, 2022, DOI 10.3389/fmicb.2021.781831

Abstract: Some studies have reported the importance of rhizobium in mitigating heavy metal toxicity, however, the regulatory mechanism of the alfalfa-rhizobium symbiosis to resist copper (Cu) stress in the plant-soil system through biochemical reactions is still unclear. This study assessed the effects of rhizobium (*Sinorhizobium meliloti* CCNWSX0020) inoculation

on the growth of alfalfa and soil microbial characteristics under Cu-stress...

Potential use of arbuscular mycorrhizal fungi for simultaneous mitigation of arsenic and cadmium accumulation in rice

Authors: Li H, Gao MY, Mo CH and more...

Source: Journal of Experimental Botany 73(1): 0-67, 2022, DOI 10.1093/jxb/erab444

Abstract: Rice polluted by metal(loid)s, especially arsenic (As) and cadmium (Cd), imposes serious health risks. Numerous studies have demonstrated that the obligate plant symbionts arbuscular mycorrhizal fungi (AMF) can reduce As and Cd concentrations in rice. The behaviours of metal(loid)s in the soil-rice-AMF system are of significant interest for scientists in the fields of plant biology, microbiology, agriculture, and environmental science...

Long-Term Effects of Soil Remediation with Willow Short Rotation Coppice on Biogeographic Pattern of Microbial Functional Genes

Authors: Liu WJ, Xue K, Hu RP and more...

Source: Microorganisms 10, 1, 2022, DOI 10.3390/microorganisms10010140

Abstract: Short rotation coppice (SRC) is increasingly being adopted for bioenergy production, pollution remediation and land restoration. However, its long-term effects on soil microbial communities are poorly characterized. Here, we studied soil microbial functional genes and their biogeographic pattern under SRC with willow trees as compared to those under permanent grassland (C). GeoChip analysis showed a lower functional gene diversity in SRC than in C soil, whereas microbial ATP and respiration did not change...

Microalgal and cyanobacterial strains used for the bio sorption of copper ions from soil and wastewater and their relative study

Authors: Zada S, Raza S, Khan S and more...

Source: Journal of Industrial and Engineering Chemistry 105: 463-472, 2022, DOI 10.1016/j.jiec.2021.10.003

Abstract: Heavy metals and other organic pollutants are the hazardous materials causing soil and water pollution, hence, bioremediation of these components is a matter of concern for environmental biotechnologists. Twenty one microalgal and cyanobacterial strains were evaluated for removal of copper from aqueous solutions and soil containing 10 ppm copper. 5 out of 21 strains have shown comparatively higher tolerance to copper stress...

Improvement of plant diversity along the slope of an historical Pb-Zn slag heap ameliorates the negative effect of heavy metal on microbial communities

Authors: Sun CL, Wu P, Wang GH, Kong XJ

Source: Plant and Soil 2022, DOI 10.1007/s11104-022-05299-3

Abstract: Historical Zn extraction operations have generated many Pb-Zn slag heaps characterized by long slopes. To understand the natural recovery process and to plan future remediation actions, investigating the response of plants, soil, and microbes and their interactions to slopes is necessary...

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Heavy metal domestication enhances beneficial effects of arbuscular mycorrhizal fungi on lead (Pb) phytoremediation efficiency of *Bidens parviflora* through improving plant growth and root Pb accumulation

Authors: Yang YR, Huang BT, Xu JZ and more...

Source: Environmental Science and Pollution Research 2022, DOI 10.1007/s11356-022-18588-2

Abstract: Native arbuscular mycorrhizal fungi (AMF) generally provide more effective assistance for phytoremediation to remove heavy metal (HM) from polluted soils than non-native AMF. Nevertheless, it is a time-consuming work to isolate, identify, and propagate AMF inoculum for practical application. This study aims to explore an alternative method to improve the phytoremediation efficiency of Bidens parviflora using domesticated AMF under HM stress condition for a certain period of time...

How Does Land Consolidation Affect Soil Fungal Community Structure? Take Heavy Metal Contaminated Areas in Eastern China for Example

Authors: Lin YB, Yang HR, Ye YM and more...

Source: Land 11, 1, 2022, DOI 10.3390/land11010142

Abstract: Farmland land consolidation can effectively improve the quality of farmland soil and the agricultural production level, and can effectively guarantee farmland ecology and food security, which has been widely used in the world. A large number of studies have shown that farmland consolidation has certain adjustments to the basic physical and chemical properties of soil and the content of heavy metals. As a key indicator of soil quality and ecological conditions, soil microorganisms play an important role in soil pollution restoration and the promotion of crop growth. However, there are few domestic and foreign studies on how farmland consolidation affects soil microbial properties, and there are no related reports on the mechanism of action between them, which is a blank in the field of agricultural land consolidation and soil microecology, especially in heavy metal contaminated areas...

Biotransformation of Chromium (VI) via a Reductant Activity from the Fungal Strain *Purpureocillium lilacinum*

Authors: Gonzalez JFC, Rodriguez IA, Teran Figueroa YT and more...

Source: Journal of Fungi 7, 12, 2022, DOI 10.3390/jof7121022

Abstract: Industrial effluents from chromium-based products lead to chromium pollution in the environment. Several technologies have been employed for the removal of chromium (Cr) from the environment, including adsorption, ion-exchange, bioremediation, etc. In this study, we isolated a Cr (VI)-resistant fungus, *Purpureocillium lilacinum*, from contaminated soil, which could reduce chromium...

Development of an Autochthonous Microbial Consortium for Enhanced Bioremediation of PAH-Contaminated Soil

Authors: Roszak M, Jablonska J, Stachurska X and more...

Source: International Journal of Molecular Sciences 22, 24, 2022, DOI 10.3390/ijms222413469

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Abstract: The main objectives of this study were to isolate bacteria from soil chronically contaminated with polycyclic aromatic hydrocarbons (PAHs), develop an autochthonous microbial consortium, and evaluate its ability to degrade PAHs in their native contaminated soil...

Bioremediation of Pesticide-contaminated Soil: A Review on Indispensable Role of Soil Bacteria

Authors: Randika JLPC, Bandara PKGSS, Soysa HSM and more...

Source: JOURNAL OF AGRICULTURAL SCIENCES 7(1):19-43, 2022, DOI 10.4038/jas.v17i1.9609P

Abstract: Scientists have identified a plenty of bacterial strains having ability to degrade pesticide residues accumulated in the environment. Due to wide variation of chemical properties of pesticides, a single strain may not be versatile. Hence, identification of bioremediation ability of various bacteria is important. This review focused on understanding and explaining the role of soil bacteria having pesticide detoxification ability.

Characterization of plant growth-promoting bacteria isolated from the rhizosphere of *Robinia pseudoacacia* growing in metal-contaminated mine tailings in eastern Morocco

Authors: Bennis M, Perez-Tapia Vi, Alami S and more...

Source: Journal of Environmental Management 304, 2022, DOI 10.1016/j.jenvman.2021.114321

Abstract: Mining activity in the Touissit district of Eastern Morocco has led to an unprecedented accumulation of heavy metals, mainly lead and zinc, in the tailing ponds of the open-air mines. This poses a real danger to both the environment and local population. The goal of this work was to characterize the Plant Growth Promoting Rhizobacteria (PGPR) isolated from the rhizosphere soil of *R. pseudoacacia* plants grown wild in the abandoned Pb-and Zn-contaminated tailing ponds in the mining district of Touissit, in Eastern Morocco...

Lindane removal in contaminated soil by defined microbial consortia and evaluation of its effectiveness by bioassays and cytotoxicity studies

Authors: Sahoo B, Chaudhuri S

Source International Microbiology 2022, DOI10.1007/s10123-022-00232-1

Abstract Lindane contamination in different environmental matrices has been a global concern for long. Bacterial consortia consisting of Paracoccus sp. NITDBR1, Rhodococcus rhodochrous NITDBS9, Ochrobactrum sp. NITDBR3, NITDBR4 and NITDBR5 were used for the bioremediation of soil artificially contaminated with lindane...

Tapping the Role of Microbial Biosurfactants in Pesticide Remediation: An Eco-Friendly Approach for Environmental Sustainability

Authors: Raj A, Kumar A, Dames JF

Source: Frontiers in Microbiology 2, 2021, DOI 10.3389/fmicb.2021.791723

Abstract: Pesticides are used indiscriminately all over the world to protect crops from pests and pathogens. If they are used in excess, they contaminate the soil and water bodies and

negatively affect human health and the environment. However, bioremediation is the most viable option to deal with these pollutants, but it has certain limitations. Therefore, harnessing the role of microbial biosurfactants in pesticide remediation is a promising approach...

Statistical Assessment of Phenol Biodegradation by a Metal-Tolerant Binary Consortium of Indigenous Antarctic Bacteria

Authors: Subramaniam K, Ahmad SA, Convey P and more...

Source: Diversity Basel 13, 12, 2021, DOI 10.3390/d13120643

Abstract: Since the heroic age of Antarctic exploration, the continent has been pressurized by multiple anthropogenic activities, today including research and tourism, which have led to the emergence of phenol pollution. Natural attenuation rates are very slow in this region due to the harsh environmental conditions; hence, biodegradation of phenol using native bacterial strains is recognized as a sustainable remediation approach...

Endophytic bacteria promote biomass production and mercury-bioaccumulation of Bermuda grass and Indian goosegrass

Authors: Ustiatik R, Nuraini Y, Suharjono S and more...

Source: International Journal of Phytoremediation 2002, DOI 10.1080/15226514.2021.2023461

Abstract: Plant growth-promoting endophytic bacteria can potentially improve the biomass production of Hg-accumulating grasses, resulting in improved Hg extraction from contaminated soils. This study aimed to analyze the effect of inoculation of Hg-resistant endophytic bacteria (i) *Jeotgalicoccus huakuii* (B1) and (ii) *Bacillus amyloliquefadens* (B2)...

Rare soil species impact the rhizosphere bacterial communities and cadmium uptake by *Lolium multiflorum* Lam.

Authors: Gao CX, Zhu Y, Xiao X and more...

Source: Plant and Soil 2022, DOI 10.1007/s11104-021-05291-3

Abstract: Purpose Diverse rare taxa are increasingly recognized as drivers of key functions in ecosystems. However, less attention has been given to their importance in the remediation of metal-contaminated soils by phytoextraction...

Heteroauxin-producing bacteria enhance the plant growth and lead uptake of *Miscanthus floridulus* (Lab.)

Authors: Xiao YH, Liu HM, Chen R and more...

Source: International Journal of Phytoremediation 2022, DOI 10.1080/15226514.2021.2024134

Abstract: This study investigated the effects of single and mixed IAA-producing bacteria on the phytoremediation of Pb-contaminated soils and the growth of energy crop-Miscanthus floridulus (Lab.)...

https://dx.doi.org/10.17180/1ag1-9f08
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Transcriptome expression analysis of the gene regulation mechanism of bacterial mineralization tolerance to high concentrations of Cd^{2+}

Authors: Huang SS, Liu RL, Sun ML and more...

Source: Science of the Total Environment 806, 4, 2022, DOI 10.1016/j.scitotenv.2021.150911

Abstract: Cadmium (Cd) pollution is a pressing environmental issue that must be addressed. In recent years, microbial mineralization biotechnology has been developed into an effective and eco-friendly heavy metal bioremediation solution. In the present research, RNA-Seq technology was utilized to reveal the molecular mechanism through which Bacillus velezensis LB002 induced the mineralization and Cd2+ fixation under high-concentration Cd2+ stress...

Soil heavy metals and phytoremediation by *Populus deltoides* alter the structure and function of bacterial community in mine ecosystems

Authors: Zhang X, Zeng BQ, Li H and more...

Source: Applied Soil Ecology 172, 2022, DOI 10.1016/j.apsoil.2021.104359

Abstract: Despite the fact that microbes act as key indicators of soil heavy metal (HMs) toxicity, their variations and adaptation to the long-term HMs pollution in mine ecosystems, particularly field study knowledge of the effects of phytoremediation, remain insufficient...

Mutualistic fungus *Piriformospora indica* modulates cadmium phytoremediation properties of host plant via concerted action of enzymatic and non-enzymatic biochemicals

Authors: Khalid M, Ur-rahman S, Tan HX and more...

Source: Pedosphere 32(2): 256-267, 2022, DOI 10.1016/S1002-0160(21)60014-0

Abstract: Soils and ecosystems contaminated with cadmium (Cd) threaten human health and adversely affect morphological, physiological, and biochemical parameters of plants. The symbiotic association of endophytic fungi with their host plants is the best strategy to improve various plant characteristics and remediate soils polluted with heavy metal(loid)s (HMs)...

Tenebrio molitor: possible source of polystyrene-degrading bacteria

Authors: Machona O, Chidzwondo F, Mangoyi R

Source: BMC Biotechnology 22, 1, 2022, DOI 10.1186/s12896-021-00733-3

Abstract: Background The excessive use of polystyrene as a packaging material has resulted in a rise in environmental pollution. Polystyrene waste has continually increased water pollution, soil pollution and the closing of landfill sites since it is durable and resistant to biodegradation. Therefore, the challenge in polystyrene disposal has caused researchers to look for urgent innovative and eco-friendly solutions for plastic degradation. The current study focuses on the isolation and identification of bacteria produced by the larvae of beetle *Tenebrio molitor* (yellow mealworms), that enable them to survive when fed with polystyrene foam as their sole carbon diet...

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AMF species improve yielding potential of Cd stressed pigeonpea plants by modulating sucrose-starch metabolism, nutrients acquisition and soil microbial enzymatic activities

Authors: Bisht A, Garg N

Source: Plant Growth Regulation 2022, DOI 10.1007/s10725-021-00791-9

Abstract: Cadmium (Cd) is one of the most perilous soil contaminants, restricting growth and yielding potential of crop plants. Arbuscular mycorrhizal fungi (AMF) can impart Cd stress tolerance by establishing a mutualistic relationship with host plants...

Harnessing Endophytic Fungi for Enhancing Growth, Tolerance and Quality of Rose-Scented Geranium (*Pelargonium graveolens* (L'Her) Thunb.) Plants under Cadmium Stress: A Biochemical Study

Authors: El-Shafey NM, Marzouk MA, Yasser MM and more...

Source: Journal of Fungi 7, 2, 2021, DOI 10.3390/jof7121039

Abstract: Heavy metal contamination in soil is increasing rapidly due to increasing anthropogenic activities. Despite the importance of rose-scented geranium as a medicinal plant, little attention was paid to enhancing its productivity in heavy metal-polluted soil. In this regard, endophytes improve plant resistance to heavy metal toxicity and enhance its tissue quality...

Biodiversity of Root Endophytic Fungi from *Oxyria sinensis* Grown in Metal-Polluted and Unpolluted Soils in Yunnan Province, Southwestern China

Authors: Zhu MY, Ding YH, Li XJ and more...

Source: Plants-Basel 10, 12, 2021, DOI 10.3390/plants10122731

Abstract: *Oxyria sinensis* adopts a tolerant strategy as a metal excluder to survive toxic metal concentrations. Biodiversity and the endophytic fungal community colonizing the *O. sinensis* roots were assessed from a mining area (MA) and a neighboring non-mining area (nMA) in southwestern China...

Succession of Microbial Communities in Waste Soils of an Iron Mine in Eastern China

Authors: Zhang Q, Wei PF, Banda JF and more...

Source: Microorganisms 9, 12, 2021, DOI 10.3390/microorganisms9122463

Abstract: The reclamation of mine dump is largely centered on the role played by microorganisms. However, the succession of microbial community structure and function in ecological restoration of the mine soils is still poorly understood...

High genetic diversity in arbuscular mycorrhizal fungi influences cadmium uptake and growth of cocoa plants

Authors: Vallejos-Torres G, Ruiz-Valles R, Chappa-Santa Maria CE and more...

Source: Bioagro 34(1):5-84, 2022, DOI 10.51372/bioagro341.7

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Abstract: Soil cadmium (Cd) represents a problem in cocoa farms in Peru. The objective of this study was to evaluate the effect of the diversity of arbuscular mycorrhizal fungi (AMF) from different provinces of the Peruvian Amazon on cadmium uptake and cacao plant growth under nursery conditions...

Microbial Diversity and P Content Changes after the Application of Sewage Sludge and Glyphosate to Soil

Authors: Wydro U, Wolejko E, Lozowicka B, Jablonska-Trypuc A

Source: Minerals 11, 12, 2021, DOI 10.3390/min11121423

Abstract: Pesticides, despite their side effects, are still being used in almost every agriculture, horticulture, maintaining municipal greenery in urban areas and even in home gardens. They influence human life and health and the functioning of entire ecosystems, including inanimate elements such as water and soil. The aim of the study was the evaluation of the suitability of sewage sludge in improving the quality of soil treated with a non-selective herbicide-glyphosate, applied as Roundup 360 SL...

Soil Fungi for Bioremediation of Pesticide Toxicants: A Perspective

Authors: Mohapatra D, Rath SK, Mohapatra PK

Source: Geomicrobiology Journal 2021, DOI 10.1080/01490451.2021.2019855

Abstract: Soil is the basis of all agroecosystem and its health is of utmost importance for the better productivity and sustainability of agriculture but soil health is constantly deteriorating due to the addition of xenobiotic compounds by various agronomicals and industrial applications. Pesticides are widely used throughout the world for controlling the spread of various pests in agroecosystem but the persistent nature and non-targeted toxicity of the compounds have also become the major concern for agroecosystem and is directly hampering the yield of agricultural produce. Hence, removal of these substances is of utmost importance and a variety of approaches are in progress...

New Mobilization Pathway of Antimonite: Thiolation and Oxidation by Dissimilatory Metal-Reducing Bacteria via Elemental Sulfur Respiration

Authors: Ye L, Zhong W, Zhang M, Jing CY

Source: Environmental Science & Technology, 2021, DOI 10.1021/acs.est.1c05206

Abstract: Antimony (Sb) mobilization is widely explored with dissimilatory metalreducing bacteria (DMRB) via microbial iron(III)-reduction. Here, our study found a previously unknown pathway whereby DMRB release adsorbed antimonite (SbIII-O) from goethite via elemental sulfur (S0) respiratory reduction under mild alkaline conditions...

Development of a novel promoter engineering-based strategy for creating an efficient para-nitrophenol-mineralizing bacterium

Authors: Huo KY, Liu YJ, Huang R and more...

Source: Journal of Hazardous Materials 424, D, 2022, DOI 10.1016/j.jhazmat.2021.127672

Abstract: A toxic and persistent pollutant para-nitrophenol (PNP) enters into the environment through improper industrial waste treatment and agricultural usage of chemical pesticides, leading to a potential risk to humans. Although a variety of PNP-degrading bacteria have been isolated, their application in bioremediation has been precluded due to unknown biosafety, poor PNP-

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mineralizing capacity, and lack of genome editing tools...

Genomic and proteomic insights into the heavy metal bioremediation by cyanobacteria

Authors: Chakdar H, Thapa S, Srivastava A, Shukla P

Source: Journal of Hazardous Materials 424, C, 2022, DOI 10.1016/j.jhazmat.2021.127609

Abstract: Review, Heavy metals (HMs) pose a global ecological threat due to their toxic effects on aquatic and terrestrial life. Effective remediation of HMs from the environment can help to restore soil's fertility and ecological vigor, one of the key Sustainable Development Goals (SDG) set by the United Nations. The cyanobacteria have emerged as a potential option for bioremediation of HMs due to their unique adaptations and robust metabolic machineries...

Pseudomonas sp. TCd-1 significantly alters the rhizosphere bacterial community of rice in Cd contaminated paddy field

Authors: Qian X, Lu QX, He XS and more...

Source: Chemosphere 290, 2021, DOI 10.1016/j.chemosphere.2021.133257

Abstract: Cadmium (Cd) pollution of paddy soils is one of the main concerns causing food security and environmental problems. Microbial bioremediation is an effective and eco-friendly measure that uses microbes to reduce Cd accumulation in crops. Additionally, rhizosphere bacterial communities also act essential roles in crop tolerance of heavy metals. However, the effects of inoculations with Cd resistant bacteria on crop rhizosphere bacterial communities under Cd exposure are largely unknown...

Bioremediation potential of hydrocarbon degrading bacteria: isolation, characterization, and assessment

Authors: Hossain MF, Akter MA, Sohan MSR and more...

Source: Saudi Journal of Biological Sciences 29(1): 211-216, 2021, DOI 10.1016/j.sjbs.2021.08.069

Abstract: Oil contamination is a worldwide concern now. However, oil contaminated environment is enriched with microorganisms that can utilize petroleum oil and use hydrocarbon for their growth, nutrition and metabolic activities. In the present study, bacteria present in the oil contaminated soil were isolated by enrichment culture technique using Minimal Salt (MS) media supplemented with diesel oil and burned engine oil as a sole carbon source...

Enhanced effects of walnut green husk solution on the phytoextraction of soil Cd and Zn and corresponding microbial responses

Authors: Liu X, Wu YX, Lu Y and more...

Source Chemosphere 289, 2022, DOI10.1016/j.chemosphere.2021.133136

Abstract: Walnut green husk (WGH) is a common agricultural waste, but it may be conducive to phytoremediation of heavy metals owing to its abundant phenolic hydroxyl, carboxyl, and other functional groups. In this study, WGH solution was used as an enhancer in the phytoextraction process via *Sedum plumbizincicola*, a hyperaccumulator of Zn and Cd. Microbial responses in the soil and plants were seamlessly analyzed to determine the underlying mechanisms of heavy metal extraction in this process...

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Microbial Response to Phytostabilization in Mining Impacted Soils Using Maize in Conjunction with Biochar and Compost

Authors: Ducey TF, Sigua GC, Novak JM and more...

Source: Microorganisms 9, 12, 2021, DOI 10.3390/microorganisms9122545

Abstract: Even after remediation, mining impacted soils can leave behind a landscape inhospitable to plant growth and containing residual heavy metals. While phytostabilization can be used to restore such sites by limiting heavy metal spread, it is reliant on soil capable of supporting plant growth. Manure-based biochars, coupled with compost, have demonstrated the ability to improve soil growth conditions in mine impacted soils, however there is a paucity of information regarding their influence on resident microbial populations...

Interactive effects of biochar amendment and lead toxicity on soil microbial community

Authors: Wan YS, Devereux R, George SE and more...

Source: Journal of Hazardous Materials 25, 2022, DOI 10.1016/j.jhazmat.2021.127921

Abstract: This study determined the interactive effects of biochar and lead toxicity on the soil microbial community in a phytoextraction experiment. Arranged with a completely randomized design in a greenhouse, banana liners were planted singly in a sandy soil spiked with $Pb(NO_3)_2$ at 0, 400 and 1200 mg kg-1 and amended with bamboo biochar (pyrolyzing at 600 degrees C) at 0, 1, 3%...

Effects of bacterial inoculation and calcium source on microbial-induced carbonate precipitation for lead remediation

Authors: Xue ZF, Cheng WC, Wang L, Hu WL

Source: Journal of Hazardous Materials 426, 2022, DOI 10.1016/j.jhazmat.2021.128090

Abstract: Heavy metal contamination has caused serious threats to surrounding fragile environments and human health. While the novel microbial-induced carbonate precipitation (MICP) technology in the recent years has been proven effective in improving material mechanical and durability properties, the mechanisms remedying heavy metal contamination still remain unclear. In this study, the potential of applying the MICP technology to the lead remediation under the effects of urease activity and calcium source was explored...

Metal adaptation and transport in hyphae of the wood-rot fungus *Schizophyllum commune*

Authors: Traxler L, Shrestha J, Richter M and more...

Source: Journal of Hazardous Materials 425, 2022, DOI 10.1016/j.jhazmat.2021.127978

Abstract: Fungi living in heavy metals and radionuclides contaminated environments, namely the Chernobyl Exclusion Zone need to be able to cope with these pollutants. In this study, the wood-rot fungus *Schizophyllum commune* was investigated for its metal tolerance mechanisms, and for its ability to transport such metals through its hyphae. Effects of temperature and pH on tolerance of Cs, Sr, Cd, and Zn were tested...

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Enhanced Lead (Pb) immobilization in red soil by phosphate solubilizing fungi associated with tricalcium phosphate influencing microbial community composition and Pb translocation in *Lactuca sativa* L.

Authors: Hao SF, Wang PY, Ge F and more...

Source: Journal of Hazardous Materials 424, D, 2022, DOI 10.1016/j.jhazmat.2021.127720

Abstract: Phosphate (P) minerals and phosphate solubilizing fungi (PSF) play essential roles in lead (Pb) immobilization, but their roles in driving Pb bioavailability and ecological risks in red soil remains poorly understood. In this study, the inoculation of *P. oxalicum* and TCP successfully enhanced available P (AP) and urease concentrations in artificially Pb contaminated red soil...

Microbial Technologies Employed for Biodegradation of Neonicotinoids in the Agroecosystem

Authors: Ahmad S, Cui DM, Zhong GH, Liu J

Source: Frontiers in Microbiology 12, 2021, DOI 10.3389/fmicb.2021.759439P

Abstract: (Review) Neonicotinoids are synthetic pesticides widely used for the control of various pests in agriculture throughout the world. They mainly attack the nicotinic acetylcholine receptors, generate nervous stimulation, receptor clot, paralysis and finally cause death....

Comparative Study of Heavy Metal Uptake and Analysis of Plant Growth Promotion Potential of Multiple Heavy Metal-Resistant Bacteria Isolated From Arable Land

Authors: Saha J, Sarkar M, Mandal P, Pal, A

Source: Current Microbiology 79, 1, 2022, DOI 10.1007/s00284-021-02704-5

Abstract: Heavy metal-induced pollution is a serious environmental concern. This study was aimed at exploring indigenous heavy metal-resistant and plant growth promoting bacteria from arable land that might be useful for developing green strategies to counter the challenges related to bioremediation and sustainable agriculture. A thorough screening and characterization of all the twenty heavy metal-resistant bacterial isolates obtained in this study was done...

Bacterial communities and their bioremediation capabilities in oil-contaminated agricultural soils

Authors: Devi SP, Jani K, Sharma A, Jha DK

Source: Environmental Monitoring ansd Assessment 194, 1, 2022, DOI 10.1007/s10661-021-09669-9

Abstract: Rapid industrialization and development in petrochemical industries have resulted in increased hydrocarbon pollution causing substantial damage to the natural ecosystems including agricultural soils. In the recent, past efforts have been made to treat the contaminated soils using microorganisms by natural processes. Soil bacteria, known for their potential to degrade the soil contaminants, play a vital role in maintaining soil health. In the current study, we observed the influence of hydrocarbon

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contamination on the physicochemical characteristics and enzymatic activities of the soil...

Isolation, Screening, and Degradation Characteristics of a Quinclorac-Degrading Bacterium, Strain D, and Its Potential for Bioremediation of Rice Fields Polluted by Quinclorac

Authors: Huang SQ, Pan JY, Tuwang MC and more...

Source: Microbiology Spectrum 9, 2, 2021, DOI10.1128/Spectrum.00398-21

Abstract: Quinclorac (QNC) is a persistent, highly selective, hormonal herbicide of low toxicity. QNC accumulates in soil and affects the growth and development of crops planted subsequent to its application. In this study, we isolated and screened a QNC-degrading bacterial strain, strain D, from rice paddy soil...

Augmented complete mineralization of glyphosate in wastewater via microbial degradation post CWAO over supported Fe-CNF

Authors: Gupta P, Pandey K, Verma N

Source: Chemical Engineering Journal 428, 2022, DOI 10.1016/j.cej.2021.132008

Abstract: Glyphosate, a widely used post emergence broad spectrum herbicide, recognized for its harmful impact on the environment, is sequentially mineralized in a two-step process: catalytic wet air oxidation (cWAO) followed by microbial degradation...

Screening of phorate degrading bacteria and its application in biormediation ofphorate contaminated soil

Authors: Dai L, Sun Y, Yan D and more...

Source: Fresenius Environmental Bulletin 30(11A): 12354-12361, 2021

Abstract: Three kinds of bacteria, named JBL-M02, JBL-M07 and JBL-M16, were isolated from the soil, which could degrade phorate effectively.JBL-M02, JBL-M07 and JBL-M16 were identified as *Bacillus toyonensis*, *Bacillits halmapalus* and *Bacillus tequilensis*. The degradation efficiency of 10mg/L of phorate by JBL-M02 could reach about 95% in 6days, and JBL-M07and JBL-M16 could reach 93% and 98%respectively under the same conditions. The combination of JBL-M02 and JBL-M16 could significantly accelerate the degradation of phorate, and the degradation efficiency was significantly better than other combinations. JBL-M07and JBL-M16 have been successfully developed into a microbial agent for bioremediation of phorate pollution, and the new microbial agent could also effectively degrade some other organophosphorus pesticides.

Indigenous bacterial community of heavy metal tolerance in the rhizosphere soils of *Mimosa pudica* naturally growing on an ex-tin mining area

Authors: Abdullahi S, Haris H, Zarkasi KZ, Amir HG

Source: MALAYSIAN JOURNAL OF MICROBIOLOGY 17(6): 690-700, 2021, DOI 10.21161/mjm.211282

Abstract: The purpose of this research was to explore the composition and genomic functions of bacterial community inhabiting the rhizosphere of *Mimosa pudica*, which were naturally growing on

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tailing and non-tailing soils of an ex-tin mining area...

Bacterial community and physiological characteristics of octylphenol polyethoxylate biodegradation in soil slurries

Authors: Lau SH, Hung CH, Chang YT

Source: Applied Soil Ecology 171, 2022, DOI 10.1016/j.apsoil.2021.104317

Abstract: Octylphenol polyethoxylate (OPEO) surfactants are widely used as commercial cleaning products and agricultural pesticides. Sewage effluents containing high levels of OPEOs are often discharged into soil-slurry systems. OPEOs have been identified as endocrine-disrupting compounds and are a threat to organisms present in ecological systems. Several studies have previously investigated methods to degrade OPEOs; however, clarifications regarding the impact on environmental ecology and bacterial physiological changes are required...

Optimization of growth conditions for maximum hexavalent chromium reduction by the microbial consortium isolated from chromite mines

Authors : Leonard J, Mishra S

Source: Indian Journal of Experimental Biology 59(12): 867-876

Abstract: Hexavalent chromium (Cr(VI)) contamination is one of the important threat to the environment. Detoxification of Cr(VI) can be achieved with the use of chromium resistant bacteria. Three chromium resistant organisms were isolated from the soil of chromite mines and identified as *Serratia nematodiphila*, *Bacillus cereus* and *Bacillus sp*. SDIP3 using 16S rRNA sequencing. A consortium was developed with the isolated bacterial strains after the acclimatisation...

Possibility of Using Bacteria-Destructors for Cypermetrin Degradation

Authors: Kosimov D, Zaynitdinova L, Jorayeva R and more...

Source: JOURNAL OF PHARMACEUTICAL RESEARCH INTERNATIONAL 33(47B): 556-563, 2021, DOI 10.9734/JPRI/2021/v33i47B33155

Abstract: From soils artificially contaminated with cypermethrin, 3 isolates were obtained that were resistant to cypermethrin concentrations of 40 mg/kg soil, and their morphological, cultural and biochemical properties were studied. On the basis of the obtained strains, a bacterial consortium was developed, which consists of the cultures of Pseudomonas sp., Bacilus sp. and Ochrobactrum sp. Laboratory experiments on the decomposition of cypermethrin showed the effectiveness of this consortium, within 28 days the decomposition of cypermethrin (40 mg/kg) was 100%.

Unveiling Endophytic Bacterial Community Structures of Different Rice Cultivars Grown in a Cadmium-Contaminated Paddy Field

Authors: Chu CQ, Fan MY, Song CY and more...

Source: Frontiers in Microbiology 12, 2021, DOI 10.3389/fmicb.2021.756327to

Abstract: Endophytic bacteria play potentially important roles in the processes of plant adaptation to the environment. Understanding the composition and dynamics of endophytic bacterial communities under heavy metal (HM) stress can reveal their impacts on host development and stress tolerance. In this study, we investigated root endophytic bacterial

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communities of different rice cultivars grown in a cadmium (Cd)-contaminated paddy field...

Iron stress response and bioaccumulation potential of three fungal strains isolated from sewage-irrigated soil

Authors: El-Sayed MT, Ezzat SM, Taha AS, Ismaiel AA

Source: Journal of Appliied Microbiology 2021 DOI10.1111/jam.15372

Abstract: Contamination with heavy metal (HM) is a severe environmental issue. Therefore, there is a pressing need to create environmentally safe and cost-effective HM bioremediation approaches...

Glyphosate-Eating Fungi: Study on Fungal Saprotrophic Strains' Ability to Tolerate and Utilise Glyphosate as a Nutritional Source and on the Ability of *Purpureocillium lilacinum* to Degrade It

Authors: Spinelli V, Ceci A, Dal Bosco C and more...

Source: Microorganisms 9, 11, 2021, DOI 10.3390/microorganisms9112179

Abstract: Glyphosate is the most commonly used herbicide worldwide. Its improper use during recent decades has resulted in glyphosate contamination of soils and waters. Fungal bioremediation is an environmentally friendly, cost effective, and feasible solution to glyphosate contamination in soils. In this study, several saprotrophic fungi isolated from agricultural environments were screened for their ability to tolerate and utilise Roundup in different cultural conditions as a nutritional source...

Biodegradation of Organophosphorus Pollutants by Soil Bacteria: Biochemical Aspects and Unsolved Problems

Authors: Sviridov AV, Shushkova TV, Epiktetov DO and more...

Source: Applied Biochemistry and Microbiooogy 57, 7:836-844, 2021, DOI 10.1134/S0003683821070085

Abstract: The degradation of stable organophosphorus pollutants has been studied in six soil bacterial isolates and three strains of bacteria adapted to utilize glyphosate herbicide (GP) under laboratory conditions. Significant differences in the uptake of organophosphonates were found in taxonomically close strains possessing similar enzymatic pathways of catabolism of these compounds...

Atrazine-degrading bacteria for bioremediation strategy: A review

Authors: Abd Rani NF, Kamil KA, Aris F and more...

Source: Biocatalysis and Biotransformation 2022, DOI 10.1080/10242422.2021.2000967

Abstract: Research on atrazine has expanded over the past decade. Studies focussing on the adverse effects of atrazine, methods for atrazine removal, and evaluation of water quality have been conducted. Atrazine is a major concern as it is a predominant herbicide identified in soil and water due to its long half-life, moderate persistent, high mobility, and solubility that can be influenced by many factors. This review focuses on the most recent bacteria capable of degrading atrazine, the gene involved in the degradation, the degradation mechanism, and the bioremediation alternative for atrazine degradation...

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Cd diminution through microbial mediated degraded lignocellulose maize straw: Batch adsorption and bioavailability trails

Authors: Haris M, Hamid Y, Wang L and more...

Source: Journal of Environmental Management 302, PartA, 2022, DOI 10.1016/j.jenvman.2021.114042

Abstract: Lignocellulose degraded maize straw (LMS) was prepared with the interaction of soil-indigenous microorganisms and further deployed to attenuate the Cd contamination in polluted soil...

Microbial Transformation of Chlordecone and Two Transformation Products Formed During in situ Chemical Reduction

Authors: Hellal J, Saaidi PL, Bristeau S and more...

Source: Frontiers in Microbiology 12, 2021, DOI 10.3389/fmicb.2021.742039

Abstract: Chlordecone (CLD) is a very persistent synthetic organochlorine pesticide found in the French West Indies. Recently published work has demonstrated the potential of zero-valent iron to dechlorinate CLD by in situ chemical reduction (ISCR) in soils under water-saturated conditions, forming mono- to penta-dechlorinated CLD transformation products. These transformation products are more mobile than CLD and less toxic; however, nothing is known about their further degradation, although increasing evidence of CLD biodegradation by bacteria is being found...

The effect of amendments on *Lolium perenne* roots arbuscular mycorrhizal fungi colonization when cultivated in contaminated soil

Authors: Szada-Borzyszkowska A, Krzyzak J, Rusinowski S and more...

Source: International Journal of Envornmental Science and Technology 2021 DOI 10.1007/s13762-021-03783-4

Abstract: Arbuscular Mycorrhizal Fungi that colonize the roots of plants growing on lands contaminated by heavy metals may influence the phytostabilization process reducing the translocation of metals to the aboveground parts of the plant. This study aimed to evaluate the effects of soil amendments (lime and lignite) on the concentration of the bioavailable form of heavy metals ($CaCl_2$ extraction) in soil and on the colonization of Arbuscular Mycorrhizal Fungi in the roots of *Lolium perenne* when cultivated in contaminated soil...

Characterization of cadmium-tolerant endophytic fungi isolated from soybean (*Glycine max*) and barley (*Hordeum vulgare*)

Authors: Ignatova L, Kistaubayeva A, Brazhnikova Y and more...

Source: HELIYON 7, 11, 2021, DOI 10.1016/j.heliyon.2021.e08240

Abstract: Cadmium stress disrupts plant-microbial interactions and reduces plant growth and development. In plants, the tolerance to stress can be increased by inoculation with endophytic microorganisms. The aim of this study was to investigate the distribution of endophytic fungi in various plant organs of barley and soybean and evaluate their Cd removal ability...

https://dx.doi.org/10.17180/1ag1-9f08
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Environmental Occurrence, Toxicity Concerns, and Degradation of Diazinon Using a Microbial System

Authors: Wu XZ, Li JY, Zhou Z and more...

Source: Frontiers in Microbiology 12, 2021, DOI 10.3389/fmicb.2021.717286

Abstract: Diazinon is an organophosphorus pesticide widely used to control cabbage insects, cotton aphids and underground pests. The continuous application of diazinon in agricultural activities has caused both ecological risk and biological hazards in the environment. Diazinon can be degraded via physical and chemical methods such as photocatalysis, adsorption and advanced oxidation. The microbial degradation of diazinon is found to be more effective than physicochemical methods for its complete clean-up from contaminated soil and water environments...

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Long-term exposure to polyethylene microplastics and glyphosate interferes with the behavior, intestinal microbial homeostasis, and metabolites of the common carp (*Cyprinus carpio* L.)

Authors: Chen JJ, Rao CY, Yuan RJ et al.

Source: SCIENCE OF THE TOTAL ENVIRONMENT 814: 152681, 2022, DOI 10.1016/j.scitotenv.2021.152681

Abstract: Polyethylene microplastics (PE-MPs) and glyphosate (GLY) occur widely and have toxic characteristics, resulting in increased research interest. In this study, common carp were used to assess the individual and combined toxicity of PE-MPs (0, 1.5, or 4.5 mg/L) and GLY (0, 5, or 15 mg/L) on the brain-gut axis. After 60 days of exposure, the developmental toxicity, blood-brain barrier, locomotor behavior, intestinal barrier (physical barrier, chemical barrier, microbial barrier), and intestinal content metabolism of common carp were evaluated...

Biodegradation of low density polyethylene (LDPE) by mesophilic fungus *Penicillium citrinum* isolated from soils of plastic waste dump yard, Bhopal, India

Authors: Khan S, Ali SA, Ali AS

Source: Environmental Technology, 2022, DOI 10.1080/09593330.2022.2027025

Abstract: Low density Polyethylene (LDPE) in various forms has become a part of life. Its accretion due to non degradable nature is concern, endangering life on earth. Amongst various methods of LDPE disposal bioremediation is regarded as ecofriendly & widely accepted. Current investigation was an attempt to isolate potent PE degrading fungus from municipal landfill soils of Bhopal, India loaded with plastic waste...

The Succession of Bacterial Community Attached on Biodegradable Plastic Mulches During the Degradation in Soil

Authors: Ju ZC, Du XF, Feng K and more...

Source: Frontiers in Microbiology 12, 2022, DOI 10.3389/fmicb.2021.785737

Abstract: Despite the increasing application of biodegradable plastic mulches (BDMs) in agriculture, the colonization and succession of the

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attached microbial community on BDMs during their degradation processes remain poorly characterized. Here, we buried four types of commonly used BDMs, including pure polylactic acid (PLA), pure polybutylene adipate terephthalate (PBAT), and two mixtures of PLA and PBAT (85:15 and 15:85 w/w), and one classic polyethylene (PE) mulch in soil for 5 months...

Nitrogen fixing bacteria facilitate microbial biodegradation of a bio-based and biodegradable plastic in soils under ambient and future climatic conditions

Authors: Tanunchai B, Kalkhof S, Guliyev V and more...

Source: Environmental Science-processes & Impacts 2022, DOI 10.1039/d1em00426c

Abstract: We discovered a biological mechanism supporting microbial degradation of bio-based poly(butylene succinate-co-adipate) (PBSA) plastic in soils under ambient and future climates...

Enhanced microalgal toxicity due to polystyrene nanoplastics and cadmium co-exposure: From the perspective of physiological and metabolomic profiles

Authors: Cao J, Liao YC, Yang WS et al.

Source: JOURNAL OF HAZARDOUS MATERIALS 427: 127937, 2022, DOI 10.1016/j.jhazmat.2021.127937

Abstract: As important emerging contaminants, nanoplastics can act as vectors for other environmental pollutants, resulting in their migration throughout ecosystems and altering their toxicity. In this study, the fluorescent dye label aggravated the toxicity of polystyrene (PS) nanoplastics (100 nm diameter particles) to microalgae *Euglena gracilis*. Therefore, the toxicity of non-fluorescent labelled PS alone and in combination with divalent cadmium (Cd2+) on Euglena gracilis in the environmentally relevant concentrations was investigated...

Microplastic stress induce bioresource production and response in microalgae: a concise review

Authors: Ugya AY, Meguellati K, Aliyu AD et al.

Source: ENVIRONMENTAL POLLUTANTS AND BIOAVAILABILITY 34: 51-60, 2022, DOI 10.1080/26395940.2022.2033138

Abstract: There are many literatures on the importance of bioresources from microalgae, but this review shows how microalgae are able to respond to the stress induced by microplastics (MP) and how the process leads to the production of bioresources. The study of these bioresources is significant because they are harnessed by man as energy and pharmaceutical tools. The extent of MP in the aquatic environment, microalgae stress induced by MP, the response of microalgae to stress induced by MP and bioresource production in microalgae due to stress induced by MP are described...

Assessing implications of nanoplastics exposure to plants with advanced nanometrology techniques

Authors: Pradas del Real AE, Mitrano DM, Castillo-Michel H, Wazne M et al.

Source: Journal of Hazardous Materials 430: 128356, 2022, DOI: 10.1016/j.jhazmat.2022.128356

Abstract: Despite the increasing attention given to the impacts of nanoplastics in terrestrial environments, there is limited data about the

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effects on plants, and the quantitative information on uptake. In the present study, wheat plants grown in hydroponics were exposed to Pd-doped nanoplastics. This allowed us to quantify nanoplastics uptake and translocation to the shoots. Visualization of nanoplastics in roots was performed with synchrotron micro X-ray fluorescence (μXRF)...

Microplastics habituated with biofilm change decabrominated diphenyl ether degradation products and thyroid endocrine toxicity

Authors: Chen QQ, Zhang XY, Xie Q et al.

Source: ECOTOXICOLOGY AND ENVIRONMENTAL SAFETY 228: 112991, 2022, DOI 10.1016/j.ecoenv.2021.112991

Abstract: Microplastics (MPs) are rapidly colonized by microbial biofilms in a natural aquatic environment, and the nature of the microbial community and type of MP can result in different degradation products of organic pollutants. Here, we quantified the degradation products of a ubiquitously detected pollutant, decabrominated diphenyl ether (BDE-209), under both light-only and biota conditions and in the absence or presence of three kinds of MPs, styrofoam polystyrene, hard polyamide, and polypropylene film...

Remarkable characteristics and distinct community of biofilms on the photoaged polyethylene films in riverine microcosms

Authors: Huang HXY, Liu P, Shi YQ et al.

Source: ENVIRONMENTAL POLLUTION 292: 118485, 2022, DOI 10.1016/j.envpol.2021.118485

Abstract: Recalcitrant plastics in the environment are gradually fragmented into weathered debris distinguished from their original state by the integrative action of influencing factors, such as UV light, heating and physical abrasion. As new artificial carbon-source substrates in aquatic ecosystems, plastic products can be colonized by biofilms and even utilized by microorganisms. To investigate the influences of weathering of plastics on the colonized biofilms, freshwater samples from the Yangtze River (Nanjing, China) were collected for biofilm incubation. Based on the characterization of plastics and biofilms, the effects of plastic surface properties on biofilm characteristics were revealed by the analysis of partial least squares regression...

Comparative role of microplastics and microalgae as vectors for chlorpyrifos bioacumulation and related physiological and immune effects in mussels

Authors: Fernandez B, Campillo JA, Chaves-Pozo E et al.

Source: SCIENCE OF THE TOTAL ENVIRONMENT 807: 150983, 2022, DOI 10.1016/j.scitotenv.2021.150983

Abstract: Microplastics (MP) are contaminants of concern per se, and also by their capacity to sorb dissolved chemicals from seawater, acting as vehicles for their transfer into marine organisms. Still, the role of MP as vehicles for contaminants and their associated toxicological effects have been poorly investigated. In this work we have compared the role of MP (high density polyethylene, HDPE, ≤ 22 μm) and of natural organic particles (microalgae, MA) as vehicle for chlorpyrifos (CPF), one of the most common pesticides found in river and coastal waters. We have compared the capacity of MP and MA to carry CPF. Then, the mussel Mytilus galloprovincialis has been exposed for 21 days to dissolved CPF, and to the same amount of CPF loaded onto MP

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and MA. The concentration of CPF inmussel' tissues and several physiological, energetics and immune parameters have been analyzed after 7 and 21 days of exposure...

Seasonal variations and feedback from microplastics and cadmium on soil organisms in agricultural fields

Authors: Jiang XF, Yang Y, Wang Q, Liu N et al.

Source: ENVIRONMENT INTERNATIONAL 161: 107096, 2022, DOI 10.1016/j.envint.2022.107096

Abstract: Plastic film mulching is an important agricultural technology that plays a critical role in increasing crop yield and maintaining soil moisture. However, long-term coverage and untimely recovery lead to a large amount of plastic residues in soils. This decomposes into smaller plastics over time, which can reduce sowing quality, destroy the soil structure, and have adverse effects on soil organisms. In this study, the seasonal variations and correlations of microplastics and cadmium (Cd) in Wuxi farmland soils of Taihu Lake, China, were investigated in the spring and winter…

The Succession of Bacterial Community Attached on Biodegradable Plastic Mulches During the Degradation in Soil

Authors: Ju ZC, Du XF, Feng K, Li SZ et al.

Source: FRONTIERS IN MICROBIOLOGY 12: 785737, 2021, DOI 10.3389/fmicb.2021.785737

Abstract: Despite the increasing application of biodegradable plastic mulches (BDMs) in agriculture, the colonization and succession of the attached microbial community on BDMs during their degradation processes remain poorly characterized. Here, we buried four types of commonly used BDMs, including pure polylactic acid (PLA), pure polybutylene adipate terephthalate (PBAT), and two mixtures of PLA and PBAT (85:15 and 15:85 w/w), and one classic polyethylene (PE) mulch in soil for 5 months. Both plastic components and incubation time significantly shaped the beta-diversities of microbiota on the plastic mulches ($p < 0.001$)…

Effects of microplastics on microbial community in Zhanjiang mangrove sediments

Authors: Chen MM, Nie FH, Qamar A et al.

Source: BULLETIN OF ENVIRONMENTAL CONTAMINATION AND TOXICOLOGY Early Access, 2022, DOI 10.1007/s00128-021-03429-8

Abstract: Microplastics are easily consumed by marine animals, thereby entering the food chain and endangering animal health. However, there are few studies focusing on the effects of microplastics in mangrove sediments on microbial communities. In order to study the influence of microplastics on microorganisms, microplastics and microorganisms were extracted from Zhanjiang (Guangdong Province, China) mangrove sediments and analyzed...

The potential role of marine fungi in plastic degradation - a review

Authors: Zeghal E, Vaksmaa A, Vielfaure H et al.

Source: FRONTIERS IN MARINE SCIENCE8: 738877, 2021, DOI 10.3389/fmars.2021.738877

Abstract: Plastic debris has been accumulating in the marine realm since the start of plastic mass production in the 1950s. Due to the adverse effects on ocean life, the fate of plastics in the marine environment is an increasingly important environmental issue. Microbial degradation, in addition to weathering, has been identified as a potentially relevant breakdown route for marine plastic debris. [...] little is known about fungi-plastic interactions. Marine fungi are a generally

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understudied group of microorganisms but the ability of terrestrial and lacustrine fungal taxa to metabolize recalcitrant compounds, pollutants, and some plastic types (e.g., lignin, solvents, pesticides, polyaromatic hydrocarbons, polyurethane, and polyethylene) indicates that marine fungi could be important degraders of complex organic matter in the marine realm, too...

Plastic mulch debris in rhizosphere: Interactions with soil-microbe-plant systems

Authors: Liu Y, Hu W, Huang Q, Qin JM et al.

Source: SCIENCE OF THE TOTAL ENVIRONMENT 807 Part2: 151435, 2022, DOI 10.1016/j.scitotenv.2021.151435

Abstract: Large amounts of plastic mulch debris (PMD) accumulated in the soil can endanger agroecosystems. However, little is known about the interactions between PMD and soil-microbe-plant systems. In this study, a pot experiment (four replicates) in tropical greenhouse was conducted to investigate the effects of PMD (polyethylene) at different concentrations (0, 0.4, 0.8, 4.0, 6.0 g kg^{-1}) on soil nutrients, rhizosphere bacterial communities and rice growth. This study further explored the interactive mechanisms between PMD and environmental factors based on correlation analysis and previous studies...

Microbial communities on biodegradable plastics under different fertilization practices in farmland soil microcosms

Authors: Zhang Y, Ma J, O'Connor P, Zhu YG

Source: SCIENCE OF THE TOTAL ENVIRONMENT 809: 152184, 2022, DOI 10.1016/j.scitotenv.2021.152184

Abstract: Plastic mulching is a common practice in agricultural systems and is often combined with fertilization. Biodegradable plastics (BPs) are becoming an alternative to non-biodegradable plastics (non-BPs) for soil mulching. However, the effects of fertilization on the microbial communities on BPs remain unclear. Here, we explored the responses of the plastisphere to different fertilization practices in soil-based microcosms containing three BPs: polylactic acid (PLA), poly (butylene succinate) (PBS), and poly (butylene-adipate-co-terephthalate) (PBAT), and one non-BP (low-density polyethylene, LDPE). The 16S and ITS rRNA gene-based Illumina sequencing method were used to identify the bacterial and fungal communities on the plastics and in the soils...

Method for rapid biofilm cultivation on microplastics and investigation of its effect on the agglomeration and removal of microplastics using organosilanes

Authors: Sturm MT, Schuhen K, Horn H

Source: SCIENCE OF THE TOTAL ENVIRONMENT 806: 151388, 2022, DOI 10.1016/j.scitotenv.2021.151388

Abstract: Since microplastics were recognized as a global environmental problem in the early 2000s, research began on possible solutions such as the removal of microplastics from waters. A novel and promising approach for this pur -pose is microplastics agglomeration-fixation using organosilanes. In this study, it is investigated how biofilm cov-erage of microplastics affects this process. The biofilm was grown on the microplastics by cultivating it for one week in a packed bed column operated with biologically treated municipal wastewater enriched with glucose. The biofilm was characterized using confocal laser scanning microscopy, scanning electron microscopy, and Fourier-Transform infrared spectroscopy...

https://dx.doi.org/10.17180/1ag1-9f08
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Microplastics impacts in seven flagellate microalgae: Role of size and cell wall

Authors: Ge JK, Yang QY, Fang ZX et al.

Source: ENVIRONMENTAL RESEARCH 206: 112598, 2022, DOI 10.1016/j.envres.2021.112598

Abstract: The toxicity of microplastic particles (MPs) on aquatic environments has been widely reported; however, their effects on protists are still contradictory. For example, it is unclear if cell size and cell wall have a role in shaping the response of flagellates to MPs. In this study, seven marine flagellated microalgae (six Dinoflagellates and one Raphidophyceae) were incubated with 10 mg L-1 MPs (polystyrene plastic micro-spheres, 1 μm diameter) to address the above question by measuring different response variables, i.e., growth, optimal photochemical efficiency, chlorophyll-a content, superoxide dismutase activity, and cell morphology...

Effects of polyester microfibers (PMFs) and cadmium on lettuce (*Lactuca sativa*) and the rhizospheric microbial communities: A study involving physio-biochemical properties and metabolomic profiles

Authors: Zeb AR, Liu WT, Meng LZ and more...

Source: Journal of Hazardous Materials 424, C, 2022, DOI 10.1016/j.jhazmat.2021.127405

Abstract: Microfibers (MFs) and cadmium (Cd) are widely distributed in soil ecosystems, posing a potential threat to soil biota. To explore potential risks of single MFs and in combination with Cd (co-PMFs/Cd) to soil environment, we systematically investigated the effects of PMFs and co-PMFs/Cd treatments on physio-biochemical performance and metabolomic profile of lettuce (Lactuca sativa), as well as the rhizospheric bacterial communities...

Microplastics in soil: Impacts and microbial diversity and degradation

Authors: Kaur, P, Singh, K, Singh, B

Source: Pedosphere 32(1): 9-60, 2022, DOI10.1016/S1002-0160(21)60060-7

Abstract: Microplastics (MPs) are plastic particles less than 5 mm in size that have become a major environmental pollutant due to their ubiquitous and persistent nature. Microplastic contamination of the aquatic environment has received the most attention so far, whereas the current understanding of MP prevalence and its impacts in the terrestrial environment is largely limited...

Achievements in the production of bioplastics from microalgae

Authors: Park YK, Lee J

Source: PHYTOCHEMISTRY REVIEWS Early Access, 2022, DOI 10.1007/s11101-021-09788-8

Abstract: Plastic waste generation has been increasing considerably, which bring about several environmental problems such as microplastics. In addition to the plastic pollution, the reduction in the use of petrochemical plastics is a key aspect to enhance sustainability. To alleviate the problems, the development of an innovative solution is rightly expected. Bioplastics are an alternative for conventional petrochemical plastics, recently gaining in a lot of attention. Microalgae can be an attractive source for the production of bioplastics given that they have a very distinctive growth yield in comparison to typical lignocellulosic biomass. Therefore, the employment of microalgae to produce bioplastics affords a golden opportunity to enhance sustainability of plastic usage. Given recent scientific research achievements in bioplastic

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production from microalgae, a review of the achievements is required...

Effects of polystyrene microplastic on the growth and volatile halocarbons release of microalgae *Phaeodactylum tricornutum*

Authors: Lang XP, Ni J, He Z

Source: MARINE POLLUTION BULLETIN 174: 113197, 2022, DOI 10.1016/j.marpolbul.2021.113197

Abstract: Volatile halocarbons (VHCs) are trace greenhouse gases that can damage the ozone layer. Trihalomethanes are one of the most common VHCs and play an important role in global climate change. Due to their steadily increasing abundance, microplastics pollutants have attracted growing concern from scientists. However, their impacts on the growth of marine microalgae and the release of VHCs remain unknown. The influence of polystyrene microplastic (PS, 0.1 μm) at different concentrations (25-200 mg/L) on the growth of *P. tricornutum* and their release of trihalomethanes were studied over 96 h...

Microplastics in soil: Impacts and microbial diversity and degradation

Authors: Kaur P, Singh K, Singh B

Source: PEDOSPHERE 32: 49-60, 2022, DOI 10.1016/S1002-0160(21)60060-7

Abstract: Microplastics (MPs) are plastic particles less than 5 mm in size that have become a major environmental pollutant due to their ubiquitous and persistent nature. Microplastic contamination of the aquatic environment has received the most attention so far, whereas the current understanding of MP prevalence and its impacts in the terrestrial environment is largely limited. [...] This review is aimed towards combining the available information on the occurrence, sources, and effects of MPs on the different aspects of the terrestrial environment and to highlight the limitations in our knowledge regarding the nature and impacts of MPs in soil. The review also highlights microbial degradation of MPs as an advancing research area, with numerous microorganisms being identified as capable of efficiently degrading this persistent contaminant.

Interactions Between Plastic, Microbial Biofilms and *Gammarus pulex*: An Initial Investigation

Authors: Valentine KL, Boxall ABA **Source:** BULLETIN OF ENVIRONMENTAL CONTAMINATION AND TOXICOLOGY Early Access, 2022, DOI 10.1007/s00128-021-03448-5

Abstract: There is increasing evidence that microbial biofilms which form on the surface of marine plastics can increase plastics palatability, making it more attractive to organisms. The same information, however, does not exist for freshwater systems. This study observed the response of the freshwater amphipod Gammarus pulex when exposed to 3 cm-diameter discs of biofilm-covered plastic, both alone and when presented alongside its natural food...

Tenebrio molitor: possible source of polystyrene-degrading bacteria

Authors: Machona O, Chidzwondo F, Mangoyi R **Source:** BMC BIOTECHNOLOGY 22: 2, 2022, DOI 10.1186/s12896-021-00733-3

Abstract: The excessive use of polystyrene as a packaging material has resulted in a rise in environmental pollution. Polystyrene waste has continually increased water pollution, soil pollution and the closing of landfill sites since it is durable and resistant to biodegradation. Therefore, the challenge in polystyrene disposal has caused researchers to look for urgent

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innovative and eco-friendly solutions for plastic degradation. The current study focuses on the isolation and identification of bacteria produced by the larvae of beetle *Tenebrio molitor* (yellow mealworms), that enable them to survive when fed with polystyrene foam as their sole carbon diet. The biodegradation of polystyrene by *Tenebrio molitor* was investigated by breeding and rearing the mealworms in the presence and absence of polystyrene. A comparison was made between those fed with a normal diet and those fed on polystyrene. The mealworms which were fed with polystyrene were then dissected and the guts were collected to isolate and identify the bacteria in their guts. The viability and metabolic activity of the isolates were investigated...

The long-term effects of microplastics on soil organomineral complexes and bacterial communities from controlled-release fertilizer residual coating

Authors: Bian WX, An LR, Zhang SG and more...

Source: Journal of Environmental Management 304, 2022, DOI 10.1016/j.jenvman.2021.114193

Abstract: Controlled-release fertilizer (CRF) was applied widely in China as an efficient utilization strategy for improving grain yield and reducing the nitrogen contamination. However, it was indeterminate to know the impacts of inevitably imported plastic into the soil on sustainable development. After ten-year fixed-site experiment, the visible residual coating microplastics were separated from the soil to measure their changes, then the long-term effects...

Enhanced microbial degradation of PET and PS microplastics under natural conditions in mangrove environment

Authors: Auta HS, Abioye OP, Aransiola SA and more...

Source: Journal of Environmental Management 304, 2022, DOI 10.1016/j.jenvman.2021.114273

Abstract: In-situ bioremediation of mangrove soil contaminated with polyethylene terephthalate (PET) and polystyrene (PS) microplastics was investigated using indigenous microbial consortium with adequate capacity to degrade the plastics. Eight (8) bacteria were isolated from plastic/microplastic-inundated mangrove soil and screened for the ability to degrade PET and PS microplastics.

Nanoplastic Labelling with Metal Probes: Analytical Strategies for Their Sensitive Detection and Quantification by ICP Mass Spectrometry

Authors: Marigliano L, Grassl B, Szpunar J, Reynaud S et al.

Source: MOLECULES 26(23): 7093, 2021, DOI 10.3390/molecules26237093

Abstract: The detection and quantification of nanoplastics in aquatic environments is one of the major challenges in environmental and analytical research nowadays. The use of common analytical techniques for this purpose is not only hampered by the size of nanoplastics, but also because they are mainly made of carbon. In addition, the expected concentrations in environmental samples are below the detection limit of the majority of analytical techniques. In this context, the great detection capabilities of Inductively Coupled Plasma Mass Spectrometry (ICP-MS) in its Single Particle mode (SP-ICP-MS) have made of this technique a good candidate for the analysis of nanoplastics...

https://dx.doi.org/10.17180/1ag1-9f08
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Effects of leachates from UV-weathered microplastic on the microalgae *Scenedesmus vacuolatus*

Authors: Rummel CD,Schafer H,Jahnke A et al.

Source: ANALYTICAL AND BIOANALYTICAL CHEMISTRY Early Access, 2022, DOI 10.1007/s00216-021-03798-3

Abstract: Plastics undergo successive fragmentation and chemical leaching steps in the environment due to weathering processes such as photo-oxidation. Here, we report the effects of leachates from UV-irradiated microplastics towards the chlorophyte Scenedesmus vacuolatus. The microplastics tested were derived from an additive-containing electronic waste and a computer keyboard as well as commercial virgin polymers with low additive content, including polyethylene, polyethylene terephthalate, polypropylene, and polystyrene...

Microplastics: A tissue-specific threat to microbial community and biomarkers of discus fish (*Symphysodon aequifasciatus*)

Authors: Huang JN; Zhang Y, Xu L et al.

Source: JOURNAL OF HAZARDOUS MATERIAL 424: 127751, 2022, DOI 10.1016/j.jhazmat.2021.127751

Abstract: As detriments in aquatic environments, microplastics (MPs) have been commonly studied on organisms, but tissue-scale effects of MPs were poorly understood. Discus fish (*Symphysodon aequifasciatus*), herewith, were exposed to polystyrene MPs (0/20/200 μg/L) for 28 d...

Unraveling the plastic degradation potentials of the plastisphere-associated marine bacterial consortium as a key player for the low-density polyethylene degradation

Authors: Joshi G, Goswami P, Verma P et al.

Source: JOURNAL OF HAZARDOUS MATERIALS 425: 128005, 2022, DOI 10.1016/j.jhazmat.2021.128005

Abstract: The omnipresent accumulation and non-degradable nature of plastics in the environment are posing an everincreasing ecological threat. In this study, a total of 97 bacteria were isolated from macroplastic debris collected from the coastal environments of Andaman Island. The isolates were screened for LDPE degradation potential and were identified based on phenotypic, biochemical, and molecular characterization...

Interactive effects of polymethyl methacrylate (PMMA) microplastics and salinity variation on a marine diatom *Phaeodactylum tricornutum*

Authors: Dong JW, Li LQ, Liu QQ et al.

Source: CHEMOSPHERE 289: 133240, 2022, DOI 10.1016/j.chemosphere.2021.133240

Abstract: Until now, knowledge about the interactive effects of microplastics and environmental factors on primary producers is quite limited. In this work, a marine diatom (*Phaeodactylum tricornutum*) was exposed to polymethyl methacrylate (PMMA) microplastics at different salinities (25, 35, and 45 parts per thousand) for 10 days in order to study their interactive effects...

https://dx.doi.org/10.17180/1ag1-9f08

Polystyrene nanoplastics diminish the toxic effects of Nano-TiO_2 in marine algae Chlorella sp.

Authors: Natarajan L, Jenifer MA, Chandrasekaran N et al.

Source: ENVIRONMENTAL RESEARCH 204: 112400, 2022, DOI 10.1016/j.envres.2021.112400

Abstract: Widespread usage of nano-TiO_2 in various commercial products and their consequent release into the seawater pose a severe threat to marine biota. Nanoplastics, a secondary pollutant in the marine environment, could influence adverse effects of nano-TiO_2. The main goal of the present study was to investigate the influence of the differently functionalized polystyrene nanoplastics (COOH-PSNPs, NH2-PSNPs, and Plain-PSNPs) on the acute toxic effects of P25 nano-TiO_2 in marine algae Chlorella sp...

DROIT ET POLITIQUE DE L'ENVIRONNEMENT

Appel à projets 2022 pour l'accompagnement de collectifs d'agriculteurs engagés dans la transition agro-écologique : GIEE/30000

Draaf Nouvelle Aquitaine 28/02/22

Objectif : renforcer la dynamique engagée de l'agriculture dans la transition agro-écologique en s'appuyant sur la force des collectifs d'agriculteurs.

Afin d'en améliorer la lisibilité et l'efficacité, sont réunis dans cet appel à projets la reconnaissance et/ou le financement des GIEE et des groupes Ecophyto 30 000 ainsi qu'un dispositif appelé « émergence », dont l'objectif est d'aider à la constitution de collectifs d'agriculteurs (GIEE ou groupes 30 000) sur une année. Les accompagnements finançables concernent donc trois volets :

- Volet émergence : pour initier des projets de collectifs d'agriculteurs dans la perspective d'être reconnus GIEE ou groupe 30 000 au bout d'un an

- Volet GIEE : pour la reconnaissance en tant que GIEE et/ou le financement de l'animation de GIEE

- Volet groupes « 30 000 » : pour la reconnaissance et le financement de l'accompagnement des groupes engagés dans la transition agro-écologique à bas niveau de produits phytopharmaceutiques.

Date d'ouverture de l'AAP : 1er mars 2022

Date limite de réponse : 31 mai 2022

Projet complet à transmettre à l'adresse mail : giee.30000.draaf-nouvelle-aquitaine@agriculture.gouv.fr

Accès au document

Agroécologie et alimentation : quelles transitions pour une planète vivable ?

Fondation de France 8/02/2022

[...] Cet appel à projets propose aux acteurs locaux et aux chercheurs de s'associer pour combiner les savoirs paysans et scientifiques, les expériences sociales, les expertises locales, les projets de territoires, ... afin de tester, mettre en œuvre, évaluer, capitaliser et diffuser des expérimentations locales de production et de consommation alimentaires, qui inventent, développent, diffusent et accélèrent les transitions agro-écologiques attendues.

L'appel à projets est ouvert jusqu'au 11 mai 2022 à 17h00.

Retrouvez toutes les informations sur : fondationdefrance.org, rubrique Environnement/

Accès au document

https://dx.doi.org/10.17180/1ag1-9f08

Zero pollution: Commission seeks views on review of EU rules on use of mercury

European commission 08/02/22

Today, the Commission is launching an open public consultation on the review of the Mercury Regulation, which tackles the last remaining intentional uses of this very toxic chemical in products. The EU has policies to reduce the risk of mercury exposure for both people and the environment, with legislation covering all aspects of the mercury lifecycle. But significant amounts of mercury are still used in the EU, mainly in dental amalgam and some products such as lamps or measuring devices. As mercury pollution is persistent, such continued use contributes to its accumulation in the environment, including food. The review of the current rules will contribute to the Zero Pollution ambition for a toxic-free environment announced in the European Green Deal

Accès au document

Datavisualization: Type and number of measures by pollutant

European Environment Agency 27/01/22

Presents aggregate information on the type and number of measures put in place to improve air quality across all reporting countries, categorised in terms of: Traffic, Awareness raising, Public procurement, Fuels, Industry, Other. [...]

Accès au document

Measures put in place under air quality plans by target sector and country

European Environment agency 4/02/22

The number of measures put in place for each sector in each country are shown. These numbers are also expressed as percentages of the total number of measures put in place in each country. [...]

Accès au document

Induced Hepatic Glutathione and Metabolomic Alterations Following Mixed Pesticide and Fertilizer Exposures in Juvenile Leopard Frogs (*Lithobates sphenocephala*)

EPA 12/01/2022

[...] Limited data are available on the effects of increased nitrogen levels in nontarget species, such as amphibians, and therefore investigating alterations in the nitrogen cycle and its impacts on amphibians needs to be considered in best management practices going forward. The objective of the present study was to elucidate the impact of fertilizer (urea) and herbicide (atrazine and/or alachlor) tank mixtures on the hepatic metabolome of juvenile leopard frogs as well as to investigate alterations in oxidative stress by relating these changes to glutathione (GSH) levels. [...]

https://doi.org/10.1002/etc.5245

Accès au document

Appel à candidatures Thèses ADEME

Ademe 11/01/22

[...] Les axes et questionnements prioritaires de recherche pour lesquels sont attendus des projets de thèse pour cette édition 2022 sont précisés au sein des quatre priorités thématiques de recherche suivantes :

- Préservation et restauration des milieux et ressources dans un contexte de changement climatique

https://dx.doi.org/10.17180/1ag1-9f08

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- Economie circulaire dans une optique de résilience

- Transition écologique des systèmes énergétiques et industriels pour la neutralité carbone

- Transition écologique et société

Date de dépôt de dossiers : à partir de la semaine du 10 janvier jusqu'au 5 avril 2022 à 17h00.

Accès au document

REGLEMENTATION / DROIT

Approbation de la substance active à faible risque *Bacillus amyloliquefaciens* souche IT-45

RÈGLEMENT D'EXÉCUTION (UE) 2022/159 DE LA COMMISSION du 4 février 2022 portant approbation de la substance active à faible risque *Bacillus amyloliquefaciens* souche IT-45 conformément au règlement (CE) n° 1107/2009 du Parlement européen et du Conseil concernant la mise sur le marché des produits phytopharmaceutiques et modifiant le règlement d'exécution (UE) n° 540/2011 de la Commission

Numéro officiel : UE/2022/159
Date de signature : 04/02/2022

Liens juridiques : Modification Règlement d'exécution UE/540/2011 25/05/2011

Accès au document

Semences de betteraves sucrières traitées avec des produits phytopharmaceutiques : autorisation provisoire

Arrêté du 31 janvier 2022 autorisant provisoirement l'emploi de semences de betteraves sucrières traitées avec des produits phytopharmaceutiques contenant les substances actives imidaclopride ou thiamethoxam et précisant les cultures qui peuvent être semées, plantées ou replantées au titre des campagnes suivantes

Numéro officiel : AGRG2202952A
Date de signature : 31/01/2022

Liens juridiques : Abrogation Arrêté 05/02/2021 NOR AGRG2104041

Accès au document

DÉCISION déterminant si un produit contenant du chlorure d'alkyl (C12-16) diméthylbenzylammonium est un produit biocide

DÉCISION D'EXÉCUTION (UE) 2022/146 DE LA COMMISSION du 1er février 2022 déterminant, en vertu de l'article 3, paragraphe 3, du règlement (UE) no 528/2012 du Parlement européen et du Conseil, si un produit contenant du chlorure d'alkyl(C12-16) diméthylbenzylammonium est un produit biocide

Numéro officiel : UE/2022/146

Date de signature : 01/02/2022

Accès au document

Règles de réparation forfaitaire des enfants exposés aux pesticides

Arrêté du 7 janvier 2022 fixant les règles de réparation forfaitaire des enfants exposés aux pesticides durant la période prénatale du fait de l'activité professionnelle de l'un de leurs parents mentionnés au c du 2° de l'article L. 491-1 du code de la sécurité sociale

https://www.legifrance.gouv.fr/eli/arrete/2022/1/7/SSAS2200820A/jo/texte

JORF n°0013 du 16 janvier 2022 Texte n° 9

Accès au document

https://dx.doi.org/10.17180/1ag1-9f08

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Approbation renouvelée de la substance active «*Purpureocillium lilacinum* souche 251»

RÈGLEMENT D'EXÉCUTION (UE) 2022/19 DE LA COMMISSION du 7 janvier 2022 renouvelant **l'approbation** de la **substance** active «*Purpureocillium lilacinum* souche 251» conformément au règlement (CE) no **1107/2009** du Parlement européen et du Conseil concernant la mise sur le marché des produits **phytopharmaceutiques**, et modifiant l'annexe du règlement d'exécution (UE) n° 540/2011 de la Commission

Numéro officiel : UE/2022/19
Date de signature : 07/01/2022

Liens juridiques : Modification le 01/03/2022 Règlement d'exécution UE/540/2011 25/05/2011

Accès au document

Approbation renouvelée de la substance active «flumioxazine»

RÈGLEMENT D'EXÉCUTION (UE) 2022/43 DE LA COMMISSION du 13 janvier 2022 renouvelant **l'approbation** de la **substance** active «flumioxazine» conformément au règlement (CE) n° **1107/2009** du Parlement européen et du Conseil concernant la mise sur le marché des produits **phytopharmaceutiques**, et modifiant les annexes du règlement d'exécution (UE) n° 540/2011 de la Commission et du règlement d'exécution (UE) 2015/408

Numéro officiel : UE/2022/43
Date de signature : 13/01/2022

Liens juridiques : Modification le 01/03/2022 Règlement d'exécution UE/2015/408 11/03/2015

Modification le 01/03/2022 Règlement d'exécution UE/540/2011 25/05/2011

Accès au document

REGLEMENTATION / DEBAT

Néonicotinoïdes pour les betteraves sucrières : en l'absence de solution alternative, leur autorisation pour 2022 est légale

Conseil d'Etat 26/02/22

Plusieurs associations et représentants du monde agricole ont demandé au Conseil d'État de suspendre pour 2022 l'autorisation provisoire d'utilisation des néonicotinoïdes pour la culture des betteraves sucrières. Le juge des référés relève que la loi a expressément prévu cette possibilité de dérogation pour ces cultures, si certaines conditions sont remplies, tenant notamment aux risques pour ces cultures. Il estime que, au vu des éléments transmis par les parties, le risque d'une infestation massive de pucerons porteurs de maladies est réel et sérieux et qu'il n'existe à ce jour, malgré les recherches en cours, aucun autre moyen suffisamment efficace pour protéger ces cultures. [...]

Accès au document

PUBLICATIONS DU RESEAU ECOTOX

An optimized LC-HRMS untargeted metabolomics workflow for multi-matrices investigations in the three-spined stickleback

Authors: Lebeau-Roche E, Daniele G, Fildier A, Turies C et al.

Source: PLOS ONE 16(11): 0260354, 2021, DOI 10.1371/journal.pone.0260354

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Abstract: Environmental metabolomics has become a growing research field to understand biological and biochemical perturbations of organisms in response to various abiotic or biotic stresses. It focuses on the comprehensive and systematic analysis of a biologic system's metabolome. This allows the recognition of biochemical pathways impacted by a stressor, and the identification of some metabolites as biomarkers of potential perturbations occurring in a body. In this work, we describe the development and optimization of a complete reliable methodology based on liquid chromatography coupled to high resolution mass spectrometry (LC-HRMS) for untargeted metabolomics studies within a fish model species, the three-spined stickleback (*Gasterosteus aculeatus*)…

Micropollutants in Urban Runoff from Traffic Areas: Target and Non-Target Screening on Four Contrasted Sites

Authors: Gasperi J, Le Roux J, Deshayes S, Ayrault S et al.

Source: WATER 14(3): 394, 2022, DOI 10.3390/w14030394

Abstract: Although runoff from trafficked urban areas is recognized as a potentially significant pathway of micropollutants, runoff pollution remains poorly documented, except for relatively few historical pollutants such as some metals and hydrocarbons. Therefore, in this work, road and parking lot runoff from four sites with contrasting traffic levels were analyzed for a very broad spectrum of molecules and elements. A total of 128 pollutants and micropollutants were monitored, including inorganic (n = 41) and organic (n = 87) pollutants. Both the dissolved and particulate phases were considered…

Synthesis of New Betaine-Based Ionic Liquids by Using a "One-Pot" Amidation Process and Evaluation of Their Ecotoxicity through a New Method Involving a Hemocyte-Based Bioassay

Authors: Mbakidi JP, Barjhoux I, Aguibi K, Geffard A et al.

Source: ACS SUSTAINABLE CHEMISTRY & ENGINEERING 9(46): 15427-15441, DOI 10.1021/acssuschemeng.1c03982

Abstract: A new class of betaine-based ionic liquids (ILs) have been synthesized. Betaine is transformed into betaine amides with various anions. These amides were prepared at first through a classical four-step method; the synthesis was then improved by reducing the number of steps using a one-pot strategy for amidation. The final yields were good to high, and the various structures were fully characterized to valorize them in many domains such as catalysis, extraction, or dissolution of biopolymers. Next, to determine their ecotoxicity, a hemocyte-based bioassay was used. This new method to evaluate the ecotoxicity of ILs was also applied to other ILs [tetrabutyl-ammonium (TBA), tetrabutyl-phosphonium (TBP), and betaine- and cholinium-based ILs] to prove its efficiency and its complementarity toward other ecotoxicological assessment methods…

Potential involvement of proline and flavonols in plant responses to ozone

Authors: Boublin F, Cabassa-Hourton C, Leymarie J, Leitao L

Source: ENVIRONMENTAL RESEARCH 207: 112214, 2022, DOI 10.1016/j.envres.2021.112214

Abstract: Ozone is considered to be a major phytotoxic pollutant. It is an oxidizing molecule

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with harmful effects that can affect human health and vegetation. Due to its phytotoxicity, it constitutes a threat to food security in a context of climate change. Proline accumulation is induced in response to numerous stresses and is assumed to be involved in plant antioxidant defense. We therefore addressed the question of the putative involvement of proline in plant ozone responses by analyzing the responses of two Arabidopsis mutants (obtained in the Col-0 genetic background) altered in proline metabolism and different ecotypes with various degrees of ozone sensitivity, to controlled ozone treatments…

Surface sediment quality of the Red River (Vietnam): impacted by anthropogenic and natural factors

Authors: Le TPQ, Le ND, Hoang TTH, Rochelle-Newall E et al.

Source: INTERNATIONAL JOURNAL OF ENVIRONMENTAL SCIENCE AND TECHNOLOGY Early access, 2022, DOI 10.1007/s13762-022-03936-z

Abstract: Riverine surface sediments are known to be important sources and sinks for different variables like metals, organic carbon and nutrients. This paper presents the surface sediment quality of the Red River which was monitored for nine trace metal elements, total organic carbon and nutrients (nitrogen, phosphorus and silica) during four sampling campaigns in 2019. The results showed that Fe and As concentrations were higher than the allowed values of the Vietnam National technical regulation on the surface sediment quality QCVN 43:2017/BTNMT…

Stable Cu Isotope Ratios Show Changes in Cu Uptake and Transport Mechanisms in *Vitis vinifera* Due to High Cu Exposure

Authors: Blotevogel S, Oliva P, Denaix L, Audry S et al.

Source: FRONTIERS IN PLANT SCIENCE 12: 755944, 2022, DOI 10.3389/fpls.2021.755944

Abstract: Even though copper (Cu) is an essential plant nutrient, it can become toxic under certain conditions. Toxic effects do not only depend on soil Cu content, but also on environmental and physiological factors, that are not well understood. In this study, the mechanisms of Cu bioavailability and the homeostasis of *Vitis vinifera* L. cv. Tannat were investigated under controlled conditions, using stable Cu isotope analysis. We measured Cu concentrations and delta Cu-65 isotope ratios in soils, soil solutions, roots, and leaves of grapevine plants grown on six different vineyard soils, in a 16-week greenhouse experiment…

Investigating the impact of remediation efforts on *Hediste diversicolor* in the Seine estuary using multiple levels of biological organization

Authors: Barrick A, Barjhoux I, Marion JM, Chatel A et al.

Source: MARINE ENVIRONMENTAL RESEARCH 173: 105528, 2022, DOI 10.1016/j.marenvres.2021.105528

Abstract: The Seine Estuary is historically one of the most contaminated estuaries in Europe. In 2002 the estuary underwent major redevelopment which emphasized environmental remediation to measure biological effects. The present study investigated the health status of the sentinel species *Hediste diversicolor* in the Seine estuary by comparing data from a sampling campaign immediately after the Seine underwent reconstruction and 10 years afterward. Both

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studies implemented multiple levels of biological organization ranging from enzymatic biomarkers to population density. Integrative modeling was used to establish a holistic status assessment for H. diversicolor in the Seine…

Aquatic and terrestrial ecotoxicology considering the soil:water continuum in the Anthropocene context

Authors: Lamy I, Fabure J, Mougin C, Coutellec MA et al.

Source: ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH Early access, 2022, DOI 10.1007/s11356-022-18855-2

Edito: In 2020 two main French research institutes, INRA and IRSTEA, merged to form INRAE the French National Research Institute for Agriculture, Food and Environment. This was a timely opportunity to update the ecotoxicology delineations and to identify new key-issues to be developed at INRAE, notably by including aquatic ecosystems biodiversity and public policies as new research priorities, and for the French Ecotox network of terrestrial and aquatic ecotoxicology supported by INRAE (https://www6.inrae.fr/ecotox/) to address new research and development topics…

Removal of emerging contaminants from wastewater using advanced treatments. A review

Authors: Morin-Crini N, Lichtfouse E, Fourmentin M, Ribeiro ARL et al.

Source: ENVIRONMENTAL CHEMISTRY LETTERS Early Access, 2022, DOI 10.1007/s10311-021-01379-5

Abstract: The rise of emerging contaminants in waters challenges the scientific community and water treatment stakeholders to design remediation techniques that are simple, practical, inexpensive, effective, and environmentally friendly. Emerging contaminants include antibiotics, hormones, illicit drugs, endocrine disruptors, cosmetics, personal care products, pesticides, surfactants, industrial products, microplastics, nanoparticles, and nanomaterials. Removing those contaminants is not easy because classical wastewater treatment systems are not designed to handle emerging contaminants, and contaminants often occur as traces in complex organo-mineral mixtures. Here, we review advanced treatments for the removal of emerging contaminants in wastewater, with focus on adsorption-oriented processes using non-conventional adsorbents such as cyclodextrin polymers, metal-organic frameworks, molecularly imprinted polymers, chitosan, and nanocellulose…

Developing a European network of analytical laboratories and government institutions to prevent poisoning of raptors

Authors: Valverde I, Espin S, Gomez-Ramirez P, Sanchez-Virosta P et al.

Source: ENVIRONMENTAL MONITORING AND ASSESSMENT 194(2): 113, 2022, DOI 10.1007/s10661-021-09719-2

Abstract: Many cases of wildlife poisoning in Europe have been reported causing population declines, especially in raptors. Toxicovigilance and risk assessment studies are essential to reinforce the knowledge of the number of illegal poisoning cases and the substances involved in these crimes. Many researchers and projects in different institutions have suggested the creation of a network to improve communication and share information between European countries. This article presents the results of the Short-Term Scientific Mission titled "Developing a Network of Analytical Labs and Government Institutions" supported by the COST Action European Raptor Biomonitoring Facility (CA16224), which aims to initiate a network of veterinary forensic toxicology laboratories, in order to improve

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communication among laboratories to prevent wildlife poisoning, especially in raptors…

Does the dose make the poison? Neurotoxic insecticides impair predator orientation and reproduction even at low concentrations

Authors: Passos LC, Ricupero M, Gugliuzzo A, Soares MA et al.

Source: PEST MANAGEMENT SCIENCE Early Access, 2022, DOI 10.1002/ps.6789

Abstract: BACKGROUND Pesticides can be noxious to non-target beneficial arthropods and their negative effects have been recently recognized even at low doses. The predator Nesidiocoris tenuis (Reuter) (Hemiptera: Miridae) plays an important role in controlling insect pests in solanaceous crops, but its concurrent herbivory often poses relevant concerns for tomato production. Although insecticide side effects on N. tenuis have been previously studied, little is known on the potential implications of neurotoxic chemicals at low concentrations. We assessed the baseline toxicity of three neurotoxic insecticides (lambda-cyhalothrin, spinosad and chlorpyrifos) on N. tenuis by topical contact exposure. The behavioral and reproduction capacity of the predator was then investigated upon exposure to three estimated low-lethal concentrations (LC1, LC10 and LC30)…

Unusual evolution of tree frog populations in the Chernobyl exclusion zone

Authors: Car C, Gilles A, Armant O, Burraco P et al.

Source: EVOLUTIONARY APPLICATIONS Early Access, 2021, DOI 10.1111/eva.13282

Abstract: Despite the ubiquity of pollutants in the environment, their long-term ecological consequences are not always clear and still poorly studied. This is the case concerning the radioactive contamination of the environment following the major nuclear accident at the Chernobyl nuclear power plant. Notwithstanding the implications of evolutionary processes on the population status, few studies concern the evolution of organisms chronically exposed to ionizing radiation in the Chernobyl exclusion zone. Here, we examined genetic markers for 19 populations of Eastern tree frog (Hyla orientalis) sampled in the Chernobyl region about thirty years after the nuclear power plant accident to investigate microevolutionary processes ongoing in local populations…

Environmental fate of chlordecone in coastal habitats: recent studies conducted in Guadeloupe and Martinique (Lesser Antilles)

Authors: Dromard CR, Devault DA, Bouchon-Navaro Y, Allenou JP et al.

Source: ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH 29(1): 51-60, 2022, DOI 10.1007/s11356-019-04661-w

Abstract: The organochlorine pollution by chlordecone, an insecticide spread in the past in banana plantations, is now recognized as a major ecological, economic, and social crisis in Guadeloupe and Martinique Islands. Due to its physical and chemical properties, this molecule is particularly persistent in the natural environment. Volcanic soil of Guadeloupe and Martinique contain allophanes (amorphous clays), which favor chlordecone trapping due to their structure and physical properties. Thus, with this trapping ability, allophanes serve as a vector allowing chlordecone to contaminate runoff waters and, finally, the sea. In the present publication, several studies recently conducted in the Lesser Antilles have been compiled in order to evaluate the desorption of chlordecone from allophanes when arriving in the estuarine environment and to determine the transfer of chlordecone along marine trophic food webs...

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Distribution of pesticides and some of their transformation products in a small lentic waterbody: Fish, water, and sediment contamination in an agricultural watershed

Authors: Slaby S, Le Cor F, Dufour V, Auger L et al.

Source: ENVIRONMENTAL POLLUTION 292 PartB: 118403, 2022, DOI 10.1016/j.envpol.2021.118403

Abstract: More than 20 years after the Water Framework Directive was adopted, there are still major gaps in the sanitary status of small rivers and waterbodies at the head of basins. These small streams supply water to a large number of wetlands that support a rich biodiversity. Many of these waterbodies are fishponds whose production is destined for human consumption or for the restocking of other aquatic environments. However, these ecosystems are exposed to contaminants, including pesticides and their transformation products. This work aims to provide information on the distribution, diversity, and concentrations of agricultural contaminants in abiotic and biotic compartments from a fishpond located at the head of watersheds…

Exposure to a mixture of benzo[a]pyrene and triclosan induces multi-and transgenerational metabolic disorders associated with decreased female investment in reproduction in *Silurana (Xenopus) tropicalis*

Authors: Usal M, Veyrenc S, Darracq-Ghitalla-Ciock M, Regnault C et al.

Source: ENVIRONMENTAL POLLUTION 292 PartB: 118418, 2022, DOI 10.1016/j.envpol.2021.118418

Abstract: Animals must partition limited resources between their own growth and subsequent reproduction. Endocrine disruptors (ED) may cause maternal metabolic disorders that decrease successful reproduction and might be responsible for multi- and transgenerational effects in amphibians. We found that the frog *Silurana (Xenopus) tropicalis*, exposed to environmentally relevant concentrations of benzo[a]pyrene and triclosan throughout its life cycle, produced F1 females with delayed sexual maturity and decreased size and weight. These F1 females displayed a marked metabolic syndrome associated with decreased fasting plasma cholesterol and triglyceride concentrations and decreased gonadal development…

Environmental contamination in a high-income country (France) by antibiotics, antibiotic-resistant bacteria, and antibiotic resistance genes: Status and possible causes

Authors: Haenni M, Dagot C, Chesneau O, Bibbal D et al.

Source: ENVIRONMENT INTERNATIONAL 159: 107047, 2022, DOI 10.1016/j.envint.2021.107047

Abstract: Antimicrobial resistance (AMR) is a major global public health concern, shared by a large number of human and animal health actors. Within the framework of a One Health approach, actions should be implemented in the environmental realm, as well as the human and animal realms. The Government of France commissioned a report to provide policy and decision makers with an evidential basis for recommending or taking future actions to mitigate AMR in the environment. We first examined the mechanisms that underlie the emergence and persistence of antimicrobial resistance in the environment…

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Assessing tritium internalisation in zebrafish early life stages: Importance of rapid isotopic exchange

Authors: Arcanjo C, Maro D, Camilleri V, Cavalie I et al.

Source: JOURNAL OF ENVIRONMENTAL RADIOACTIVITY 242: 106757, 2022, DOI 10.1016/j.jenvrad.2021.106757

Erratum: "It appeared that OBT content in organisms was low with an OBT/TFWT ratio of about 8% for both stages (24 hpf and 96 hpf)." Should be read as "It appeared that OBT content in organisms was low with an OBT/TFWT ratio of about 8% and 14% at 24 hpf and 96 hphf respectively".

Pesticide toxicity towards microalgae increases with environmental mixture complexity

Authors: Gardia-Parege C, Tiam SK, Budzinski H, Mazzella N et al.

Source: ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH Early Access, 2022, DOI 10.1007/s11356-021-17811-w

Abstract: Effect-directed analysis (EDA) aims at identifying the compound(s) responsible for toxicity in a complex environmental sample where several dozens of contaminants can be present. In this study, we used an environmental mixture extracted from the Polar Organic Chemical Integrative Sampler (POCIS) previously immersed downstream a landfill (River Ponteils, South West France), to perform an EDA approach using a microalgal bioassay based on the photosynthetic capacities of diatom (*Nitzschia palea*) cultures…

Interest of a multispecies approach in active biomonitoring: Application in the Meuse watershed

Authors: Catteau A, Porcher JM, Bado-Nilles A, Bonnard I et al.

Source: SCIENCE OF THE TOTAL ENVIRONMENT 808: 152148, 2022, DOI 10.1016/j.scitotenv.2021.152148

Abstract: A biomonitoring approach based on a single model species cannot be representative of the contaminations impacts on the ecosystem overall. As part of the Interreg DIADeM program ("Development of an integrated approach for the diag-nosis of the water quality of the River Meuse"), a study was conducted to establish the proof of concept that the use of a multispecies active biomonitoring approach improves diagnostic of aquatic systems. The complementarity of the bio-marker responses was tested in four model species belonging to various ecological compartments: the bryophyte *Fontinalis antipyretica*, the bivalve *Dreissena polymorpha*, the amphipod *Gammarus fossarum* and the fish *Gasterosteus aculeatus*…

Cesium transfer to millet and mustard as a function of Cs availability in soils

Authors: Flouret A, Henner P, Coppin F, Pierrisnard S et al.

Source: JOURNAL OF ENVIRONMENTAL RADIOACTIVITY 243: 106800, 2022, DOI 10.1016/j.jenvrad.2021.106800

Abstract: 137Cs is one of the most persistent radioactive contaminants in soil after a nuclear accident. It can be taken up by plants and enter the human food chain generating a potential human health hazard. Although a large amount of literature has highlighted the role of the different processes involved in Cs uptake by plants, there is still no simple way to predict its transfer for a specific plant from a particular soil. Based on the assumption that the concentration ratio (CR) of Cs can be predicted from one plant taxon if the CR of another taxon is known and taken as reference,

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whatever the supporting soils, a series of plant/soil Cs transfer experiments were performed on Rhizotest during 21 days using three soils with different textures, clay and organic matter contents and two plants (millet and mustard) with potentially contrasting Cs uptake capacity based on their phylogeny…

Effects of carbamazepine in aquatic biota

Authors: Baali H, Cosio C

Source: ENVIRONMENTAL SCIENCE-PROCESSES & IMPACTS Early Access, 2022, DOI 10.1039/d1em00328c

Abstract: Carbamazepine (CBZ) is one of the most common pharmaceuticals found in the aquatic environment. Here, we reviewed studies in aquatic animals highlighting that CBZ affected ROS homeostasis but also the neuroendocrine system, cell viability, immunity, reproduction, feeding behavior and growth. Notably, the acetylcholinesterase activity was modified by concentrations of the order of ng L^{-1} CBZ. At ≥10 μgL^{-1}, data pointed that CBZ triggered the production of ROS, modifying the activity of antioxidant enzymes and produced a significant cellular stress at concentrations ≥ 100 $\mu g\ L^{-1}$…

Adverse outcome pathway: a path toward better data consolidation and global co-ordination of radiation research

Authors: Chauhan V, Beaton D, Hamada N, Wilkins R et al.

Source: INTERNATIONAL JOURNAL OF RADIATION BIOLOGY Early Access, 2022, DOI 10.1080/09553002.2021.2020363

Abstract: Background: The purpose of toxicology is to protect human health and the environment. To support this, the Organisation for Economic Co-operation and Development (OECD), operating via its Extended Advisory Group for Molecular Screening and Toxicogenomics (EAGMST), has been developing the Adverse Outcome Pathway (AOP) approach to consolidate evidence for chemical toxicity spanning multiple levels of biological organization. The knowledge transcribed into AOPs provides a structured framework to transparently organize data, examine the weight of evidence of the AOP, and identify causal relationships between exposure to stressors and adverse effects of regulatory relevance…

Antibiotic tolerance and degradation capacity of the organic pollutant-degrading bacterium *Rhodococcus biphenylivorans* TG9T

Authors: Yu CG, Armengaud J, Blaustein RA, Chen KZ et al.

Source: JOURNAL OF HAZARDOUS MATERIALS 424 PartD: 127712, 2022, DOI 10.1016/j.jhazmat.2021.127712

Abstract: Antibiotics are ubiquitous in soil due to natural ecological competition, as well as emerging contaminants due to anthropogenic inputs. Under environmental factors like antibiotic stress, some bacteria, including those that degrade environmental pollutants, can enter a dormant state as a survival strategy, thereby limiting their metabolic activity and function. Dormancy has a critical influence on the degradative activity of bacteria, dramatically decreasing the rate at which they transform organic pollutants. To better understand this phenomenon in environmental pollutant-degrading bacteria, we investigated dormancy transitions induced with norfloxacin in Rhodococcus biphenylivorans TG9T using next-generation proteomics, proteogenomics, and additional experiments…

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Introducing ground cover management in pesticide emission modeling

Authors: Gentil-Sergent C, Basset-Mens C, Renaud-Gentie C, Mottes C et al.

Source: INTEGRATED ENVIRONMENTAL ASSESSMENT AND MANAGEMENT 18(1): 274-288, 2022, DOI 10.1002/ieam.4482

Abstract: Ground cover management (GCM) is an important agricultural practice used to reduce weed growth, erosion and runoff, and improve soil fertility. In the present study, an approach to account for GCM is proposed in the modeling of pesticide emissions to evaluate the environmental sustainability of agricultural practices. As a starting point, we include a cover crop compartment in the mass balance of calculating initial (within minutes after application) and secondary (including additional processes) pesticide emission fractions…

New perspectives on the calculation of bioaccumulation metrics for active substances in living organisms

Authors: Ratier A, Lopes C, Multari G, Mazerolles V et al.

Source: INTEGRATED ENVIRONMENTAL ASSESSMENT AND MANAGEMENT 18(1): 10-18, 2022, DOI 10.1002/ieam.4439

Abstract: Today, only few ready-to-use and convenient decision-making tools are available in ecotoxicology concerning accumulation and effects of chemical substances on organisms, accounting for exposure situations that are known to be complex (routes of exposure, metabolism, mixtures, etc.). This paper presents new perspectives on the generic calculation of bioaccumulation metrics via the innovative web tool MOSAIC(bioacc) (http://mosaic.univ-lyon1.fr/bioacc). MOSAIC(bioacc) provides all kinds of bioaccumulation metrics associated with their uncertainty whatever the species-compound combination…

Role of Biofilms in Contaminant Bioaccumulation and Trophic Transfer in Aquatic Ecosystems: Current State of Knowledge and Future Challenges

Authors: Bonnineau C, Artigas J, Chaumet B, Dabrin A et al.

Source: REVIEWS OF ENVIRONMENTAL CONTAMINATION AND TOXICOLOGY, VOL 253:115-153, 2021, DOI 10.1007/398_2019_39

Abstract: In freshwater environments, microbial assemblages attached to submerged substrates play an essential role in ecosystem processes such as primary production, supported by periphyton, or organic matter decomposition, supported by microbial communities attached to leaf litter or sediments. These microbial assemblages, also called biofilms, are not only involved in nutrients fluxes but also in contaminants dynamics. Biofilms can accumulate metals and organic contaminants transported by the water flow and/or adsorbed onto substrates. Furthermore, due to their high metabolic activity and their role in aquatic food webs, microbial biofilms are also likely to influence contaminant fate in aquatic ecosystems. In this review, we provide (1) a critical overview of the analytical methods currently in use for detecting and quantifying metals and organic micropollutants in microbial biofilms attached to benthic substrata (rocks, sediments, leaf litter); (2) a review of the distribution of those contaminants within aquatic biofilms and the role of these benthic microbial communities in contaminant fate; (3) a set of future challenges concerning the role of biofilms in contaminant accumulation and trophic transfers in the aquatic food web…

https://dx.doi.org/10.17180/1ag1-9f08

PESTICIDES ET SANTE DES AGRICULTEURS

Quantifiable urine glyphosate levels detected in 99% of the French population, with higher values in men, in younger people, and in farmers

Authors: Grau D, Grau N, Gascuel Q, Paroissin C et al.

Source: Environmental Science and Pollution Research 2022, DOI 10.1007/s11356-021-18110-0

Abstract: Glyphosate is the most used pesticide worldwide and glyphosate is detected in the general population of industrialized countries, with higher levels found in farmers and children. Objective was to determine glyphosate levels in the French general population. This study includes 6848 participants recruited between 2018 and 2020. Glyphosate was quantified in first-void urine samples using ELISA. The results support glyphosate contamination through food and water intake. Higher occupational exposure is confirmed in farmers and farmers working in wine-growing environment. The present results show a general contamination of the French population with glyphosate.

Note : voir en rubrique Revue de Presse différents articles consacrés à cette publication.

Agricultural exposure and risk of soft tissue sarcomas and gastrointestinal stromal sarcoma in the AGRIculture and CANcer (AGRICAN) cohort

Authors: Renier M, Busson A, Boulanger M, Piel C et al.

Source: CANCER EPIDEMIOLOGY, 2022;1-12, doi:10.1002/ijc.33936

Abstract : Sarcomas are a heterogeneous group of tumors whose incidence is nearly 5 per 100 000 inhabitants in Europe. Their causes are poorly understood, although occupational exposures are suspected. The AGRICAN cohort is a prospective study of 181 842 individuals enrolled in 2005 to 2007. Associations between agricultural exposure and sarcoma overall, gastrointestinal stromal tumors and myomatous and fibrous sarcoma together, were analyzed. The risk of sarcomas was increased in several farming activities with differences according to histological subtype.

The effectiveness of educational interventions aimed at agricultural workers' knowledge, behaviour, and risk perception for reducing the risk of pesticide exposure: a systematic review and meta-analysis

Authors: Ayaz D, Oncel S, Karadag E

Source: International Archives of Occupational and Environmental Health 2022, DOI 10.1007/s00420-022-01838-8

Abstract: The aim of this study was to determine the effectiveness of educational interventions aimed at agricultural workers' knowledge, behaviour, and risk perception for reducing the risk of pesticide exposure. All studies published in the English language between the years 2000 and 2020 were screened on relevant databases. It was determined that educational interventions are an appropriate method for reducing the pesticide exposure risks of agricultural workers. To increase the effectiveness of these interventions, it is recommended that consideration is given to a theoretical basis, the use of multiple education components, and evidence-based practices.

Environmental risk factors for amyotrophic lateral sclerosis: a case-control study in Canada and France

Authors: Beaudin M, Salachas F, Pradat PF, Dupre N

Source: Amyotrophic Lateral Sclerosis and Frontotemporal Degeneration 2022, https://doi.org/10.1080/21678421.2022.2028167

Abstract: To evaluate the association between amyotrophic lateral sclerosis (ALS) and potential environmental risk factors, especially head traumas and pesticides, in two populations from Canada and France. A case-control study was performed in tertiary-care centers. A total of 404 ALS cases and 381 controls completed the questionnaire. Head trauma is a risk factor for ALS in men only. Previous occupation at high risk for pesticides exposure and electrocution are also risk factors for ALS.

Factors Associated with Levels of Organophosphate Pesticides in Household Dust in Agricultural Communities

Authors: Kuiper G, Young BN, WeMott S, Erlandson G et al.

Source: Int. J. Environ. Res. Public Health 19(2): 862, 2022, https://doi.org/10.3390/ijerph19020862

Abstract: Organophosphate (OP) pesticides are associated with numerous adverse health outcomes. Unique exposure pathways, such as proximity to agricultural operations and direct occupational contact, further complicate pesticide exposure assessment among agricultural communities. We sought to identify influencing factors of pesticide exposure to support future exposure assessment and epidemiological studies. Household dust samples were collected from 28 homes in four California agricultural communities during January and June 2019 and were analyzed for the presence of OPs.

Quantitative assessment of multiple pesticides in silicone wristbands of children/guardian pairs living in agricultural areas in South Africa

Authors: Fuhrimann S, Mol HGJ, Dias J, Dalvie MA, Roosli M

Source: Science of The Total Environment 812: 152330, 2022, https://doi.org/10.1016/j.scitotenv.2021.152330

Abstract: We aimed to assess exposure to pesticides using silicone wristbands in child/guardian pairs living on farms and in villages within two agricultural areas in South Africa. We assessed the correlation between pesticide levels and between household members using Spearman correlation coefficients (r(s)). We showed that for several pesticides children had higher exposure levels than guardians. The positive correlations observed for child/guardian pairs living in the same household suggest non-occupational shared exposure pathways in these communities.

The role of adipose tissue analysis on Environmental Pollutants Biomonitoring in women: The European scenario

Authors: Sousa S, Maia ML, Delerue-Matos C, Calhau C et al.

Source: Science of The Total Environment 806(4): 150922, 2022, DOI 10.1016/j.scitotenv.2021.150922

Abstract: In order to prevent future health issue of women and possible progeny, the assessment of endocrine disruptors accumulated is essential,

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particularly in adipose tissue. In this review, a Web of Science search without any publishing year restriction on the analysis in adipose tissue was performed. A total of 313 studies were found. The present paper is an overview on the existent EDs analytical methods and levels accumulated in women adipose tissue, with the correspondent health impli-cations across Europe.

Parental Pesticide Exposure and Childhood Brain Cancer: A Systematic Review and Meta-Analysis Confirming the IARC/WHO Monographs on Some Organophosphate Insecticides and Herbicides

Authors: Feulefack J, Khan A, Forastiere F, Sergi Consolato M

Source: CHILDREN-BASEL 8(12): 1096, 2021, DOI 10.3390/children8121096

Abstract: Brain tumors are the second most common neoplasm in the pediatric age. Pesticides may play an etiologic role, but literature results are conflicting. We searched PubMed, SCOPUS, and Google Scholar for literature (1 January 1966-31 December 2020) that assessed childhood brain tumors and parental exposure to pesticides. There is an association between CBT and parental pesticides exposure before childbirth, after birth, and residential exposure. It is in line with the IARC Monograph evaluating the carcinogenicity of diazinon, glyphosate, malathion, parathion, and tetrachlorvinphos.

Conférence / Table ronde : Pesticides : pourquoi et comment faire autrement ?

Fondation Rovaltain

4 intervenants de qualité viendront nous parler de cette thématique :

- Jean-Marc Bonmatin : chercheur au CNRS spécialiste des néonicotinoïdes,

- Julia Clause : maître de conférence en biologie du sol,

- Armand Heitz : viticulteur, maraîcher, éleveur,

- Sophie Dupille : auditrice en organisme certificateur AB, HVE…

Rendez-vous le Jeudi 24 mars à 18h au Train-Théâtre (salle Train-Cinéma) au 1 Rue Louis Aragon, Portes-lès-Valence

Accès au document

In Utero Chlordecone Exposure and Thyroid, Metabolic, and Sex-Steroid Hormones at the Age of Seven Years: A Study From the TIMOUN Mother-Child Cohort in Guadeloupe

Authors: Ayhan G, Rouget F, Giton F, Costet N et al.

Source: FRONTIERS IN ENDOCRINOLOGY 12: 771641, 2021, https://doi.org/10.3389/fendo.2021.771641

Abstract: Chlordecone is an endocrine-disrupting chemical with well recognized estrogenic and progestagenic properties. We aimed to examine the relationship of in utero exposure to chlordecone and thyroid and sex-steroid hormone levels in children at the age of seven years who participated in TIMOUN, an ongoing birth cohort in Guadeloupe. Chlordecone and hormone measurements were available for 124 boys and 161 girls. In utero chlordecone exposure was associated with elevated levels of TSH and sex-steroid hormones at seven years in a non-monotonic dose response (inverted U) relationship.

Household pesticide exposures and infant gross motor development in the MADRES cohort

Authors: Hernandez-Castro I, Eckel SP, Chavez T, Johnson M et al.

Source: PAEDIATRIC AND PERINATAL EPIDEMIOLOGY 2021, https://doi.org/10.1111/ppe.12850

Abstract: This study examined the association between early postnatal household pesticide use and infants' gross and fine motor development at 6 months of age. Questionnaires were administered via telephone to 296 mother-infant dyads in the MADRES pregnancy cohort. Our results suggest household use of rodent and insect pesticides may harm infants' gross motor development in early childhood.

Maternal occupational exposure to endocrine-disrupting chemicals during pregnancy and semen parameters in adulthood: results of a nationwide cross-sectional study among Swiss conscripts

Authors: Istvan M, Rahban R, Dananche B, Senn A et al.

Source: Human Reproduction 36(7): 1948-1958, 2021, https://doi.org/10.1093/humrep/deab034

Abstract: Is there a relationship between maternal occupational exposure to endocrine-disrupting chemicals (EDCs) during pregnancy and the semen quality of their sons? A cross-sectional study aiming to evaluate semen quality was carried out among Swiss conscripts aged 18 to 22 years between 2005 and 2017. Conscript and parent questionnaires were completed prior to the collection of a semen sample. Our results suggest an association between maternal occupational exposure to potential EDCs, especially to pesticides, phthalates and heavy metals, and a decrease in several semen parameters.

Time after a peak-pesticide use period and neurobehavior among ecuadorian children and adolescents: The ESPINA study

Authors: da Silva CE, Gahagan S, Suarez-Torres J, Lopez-Paredes D et al.

Source: Environmental Research 204, Part C: 112325, 2022, DOI 10.1016/j.envres.2021.112325

Abstract: Limited evidence exists regarding transient neurobehavioral alterations associated with episodic pesticide exposures or agricultural pesticide spray periods. We examined participants in agricultural communities in Ecuador (ESPINA study) during three periods. Neurobehavior was assessed using the NEPSY-II. Children examined sooner after the harvest had lower neurobehavioral performance compared to children examined later, suggesting that peak pesticide spray seasons may transiently affect neurobehavior followed by recovery during low pesticide-use periods. Reduction of pesticide exposure potential for children during peak pesticide-use periods is advised.

The use of hedgerows to mitigate pesticide exposure of a population living in a rural area

Authors: Langenbach T, Mager AH, Campos MM, De Falco A et al.

Source: Integrated Environmental Assessment and Management 18(1): 19-24, 2022, DOI 10.1002/ieam.4452

Abstract: The pulverization drift and volatile pesticides transported by wind are important

https://dx.doi.org/10.17180/1ag1-9f08
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sources of indoor pollution, which can be mitigated by hedgerows. This study was the first attempt in Brazil to investigate the efficiency of six different hedgerow species in reducing pesticide residues in air. A fluorescent compound (p-aminobenzoic acid or PABA) was introduced in the sprayed pesticide fluid that traced the pesticide in the water. Data indicated barrier efficiency of up to 99%. Simulation of nontarget drift contamination with herbicide concentrations exhibited reduced senescence effects on leaves and posed no threat to survival.

Identification of pesticides exposure biomarkers for residents living close to vineyards in France

Authors: Dereumeaux C, Mercier F, Soulard P, Hulin M et al.

Source: Environment International 159: 107013, 2022, DOI 10.1016/j.envint.2021.107013

Abstract: Biomonitoring can be relevant for assessing pesticides exposure of residents living close to vineyards (LCTV). The aim of the study was to develop a tiered approach to identify relevant biomarkers and matrices for assessing pesticide exposure in residents LCTV. We used samples from a biobank for 121 adults and children included in a national prevalence study conducted between 2014 and 2016 who lived near or far from vineyards. We analyzed five priority pesticides and their metabolites in urine and hair samples. Our approach helped to identify the most appropriate measurement strategies (biological matrices, analytical methods) to assess pesticide exposure in residents LCTV.

Prenatal Exposure to Nonpersistent Chemical Mixtures and Fetal Growth: A Population-Based Study

Authors: van den Dries MA, Keil AP, Tiemeier H, Pronk A et al.

Source: Environmental Health Perspectives 129(11): 117008, 2021, DOI 10.1289/EHP9178

Abstract: To assess the association between prenatal exposure to a mixture of phthalates, bisphenols, and organophosphate (OP) pesticides and fetal measures of head circumference, femur length, and weight. Within the Generation R Study, a population-based cohort in Netherlands (n = 776), urinary concentrations were measured at 18, 18-25, and 25 weeks of gestation and averaged. This finding suggests that even low levels of exposure may be sufficient to influence growth in early pregnancy, whereas higher levels may be necessary to affect birth weight. Joint exposure to nonpersistent chemicals may adversely impact fetal growth, and because these exposures are widespread, this impact could be substantial.

Self-reported psychological distress and self-perceived health in residents living near pesticide-treated agricultural land: a cross-sectional study in The Netherlands

Authors: Simoes M, Huss A, Janssen N, Vermeulen R

Source: Occupational and Environmental Medicine 2021, DOI 10.1136/oemed-2021-107544

Abstract: We aimed to study possible associations between self-reported psychological distress (SPD) and self-perceived health (SPH) in residents near pesticide-treated agricultural land. Using the Public Health Monitor national survey from 2012, we selected 216 932 participants who lived in rural and semi-urban areas of the Netherlands. Psychological distress was assessed and participants were asked to assess their own health. We estimated the area of specific crop groups cultivated within buffers of 50 m, 100 m, 250 m and 500 m around each individual's residence for the period 2009-2012. This study

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provides no evidence that residential proximity to pesticide treated-crops is associated with PD or poorer perceived health.

Using the Matrix to bridge the epidemiology/risk assessment gap: a case study of 2,4-D

Authors: Burnshttps CJ, LaKind JS

Source: Critical Reviews in Toxicology 51(7):591-599, 2021, https://doi.org/10.1080/10408444.2021.1997911

Abstract: A 2,4-D case study highlights the extent to which existing epidemiology literature includes information generally needed for risk assessments and proffers suggestions that would assist in bridging the epidemiology/risk assessment gap. Thirty-one publications identified in the US EPA 2,4-D epidemiology review were assessed. These studies focused on associations between 2,4-D exposure and NHL, respiratory effects, and birth outcomes. The use of the Matrix as a foundation for communication and education across disciplines could produce more impactful and consequential epidemiology research for robust risk assessments and decision-making.

Environmental and occupational pesticide exposure and human sperm parameters: A Navigation Guide review

Authors: Knapke ET, Magalhaes DD, Dalvie MA, Mandrioli D et al.

Source: Toxicology 465: 153017, 2022, https://doi.org/10.1016/j.tox.2021.153017

Abstract: This systematic review used the Navigation Guide to critically evaluate the current body of evidence examining sperm quality and pesticide exposure in epidemiological studies. PubMed, Scopus, and Web of Science databases were searched for all English-language articles published after September 2012 until August 2021.

These findings are largely consistent with results of previous reviews, which have found significant negative associations between pesticide exposure and sperm quality. After thirty years of mounting evidence, actions are needed to reduce pesticide risks to testicular function and male fertility.

Minimizing Occupational Exposure to Pesticide and Increasing Control Efficacy of Pests by Unmanned Aerial Vehicle Application on Cowpea

Authors: Yan XJ, Zhou YY, Liu, XH, Yang, DB et al.

Source: Applied Sciences - Basel 11(20): 9579, 2021, https://doi.org/10.3390/app11209579

Abstract: In tropical regions, pesticide applicators are more vulnerable to dermal exposure than their counterparts in temperate regions. Thus, it is highly desirable to develop new spraying methods to minimize the pesticide exposure level without sacrificing the pest control efficiency. When biopesticide spinetoram with the same dosage was applied, the field control efficacy against cowpea thrips sprayed by UAVs was higher than that of knapsack electric sprayers. The average total unit exposure of the knapsack operator was greatly higher than that of the UAV operator. The present research indicates that plant protection UAV is the direction of development of modern intensive sustainable agriculture.

Pesticide exposure of workers in apple growing in France

Authors: Bureau M, Beziat B, Duporte G, Bouchart et al.

Source: International Archives of occupational and Environmental Health 2021, https://doi.org/10.1007/s00420-021-01810-y

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Abstract: The aim of this study was to measure pesticide exposure in apple growing according to tasks and body parts. A non-controlled field study was conducted in apple orchards in 4 regions of France during the 2016 and 2017 treatment seasons. We measured pesticide dermal contamination during each task and made detailed observations of work characteristics throughout the day. Workers performing re-entry tasks, especially thinning and anti-hail net opening, presented higher contamination, either equal to or higher than in operators. For these last ones, mixing/loading and equipment cleaning were the most contaminating tasks.

Domestic use of pesticides during early periods of development and risk of testicular germ cell tumors in adulthood: a French nationwide case-control study

Authors: Danjou AMN, Perol O, Coste A, Faure E et al.

Source: Environmental Health 20(1): 111, 2021, https://doi.org/10.1186/s12940-021-00795-y

Abstract: Testicular germ cell tumours (TGCT) are the most frequent cancers in young men in developed countries and their incidence rate has doubled worldwide over the past 40 years. Early life exposures to pesticides are suspected to increase TGCT risk. Our research aimed at estimating adult TGCT risk associated with parental domestic use of pesticides during early periods of child development. We conducted a case-control study of 304 TGCT cases, aged 18-45 years old. Although recall bias may partially explain the elevated ORs, our study provides some evidence of a positive association between domestic use of pesticides during early periods of development, particularly fungicides and risk of adult TGCT and non-seminoma.

Cancer and occupational exposure to pesticides: a bibliometric study of the past 10 years

Authors: Pedroso TMA, Benvindo-Souza M, Nascimento FD, Woch J et al.

Source: Environmental science and pollution research 2021, DOI 10.1007/s11356-021-17031-2

Abstract: Occupational exposure to pesticides has been identified as a major trigger of the development of cancer. The association between the incidence of cancer and occupational exposure to pesticides investigated through a bibliometric analysis of the studies published between 2011 and 2020, based on 62 papers selected from the Scopus database. The results indicated an exponential increase in the number of studies published over the past decade. The principal classes of pesticides investigated in relation to their role in intoxication and cancer were insecticides, herbicides, and fungicides. The types of cancer reported most frequently were multiple myeloma, bladder cancer, non-Hodgkin's lymphoma, prostate cancer, leukemia, and breast cancer.

OUVRAGES / RAPPORTS / ACTES DE CONGRES

Microplastic Pollution

Linkspringer 03/02/22

- Focuses on microplastic pollution in the environment

- Discusses microplastic occurrence and impact trends in different environmental settings

https://dx.doi.org/10.17180/1ag1-9f08

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- Addresses microplatic toxicity, risk assessment and prevention strategie

This volume discusses the growing issue of global environmental microplastic pollution resulting from the industrial manufacturing of everyday products. The book focuses on the emergence of microplastic pollution, types, sources, fate, dynamic trends in the environment, occurrence in different environmental settings, toxicity, risk assessment, and prevention strategies. The authors provide a detailed explanation and provision of the techniques used for the detection, separation, and identification of microplastics for use by industry workers and scientists, along with policy recommendations for legislative bodies to reduce the spread and impact of harmful microplastics. The book will be of use to students, teachers, researchers, policy makers, and environmental organizations.

Accès au document

Surveillance dans l'air autour des installations classées : un nouveau guide disponible

Ineris 17/01/2022

L'Institut vient de publier une nouvelle version du guide "Surveillance dans l'air autour des installations classées - retombées des émissions atmosphériques, impacts des activités humaines sur les milieux".

Il apporte non seulement la méthodologie pour définir le polluant à suivre, la métrologie à mettre en œuvre, le choix des emplacements et la période de mesures, mais également la démarche pour l'interprétation des résultats des campagnes de mesure. Des études de cas ont été ajoutées en annexe, afin de rendre ce guide plus pédagogique sur des situations couramment rencontrées.

Accès au document

REVUE DE PRESSE

Des scientifiques démontent l'étude des « pisseurs » de glyphosate

La France agricole, 21/02/2022

La revue scientifique « Environmental Science and Pollution Research » publiait le 12 janvier 2022 une étude affirmant que « 99 % de la population » présente du glyphosate dans les urines. Le collectif Science-Technologies-Actions critique la méthode utilisée et la fiabilité des résultats.

Voir le site du collectif : https://sciencetechaction.tumblr.com/

Voir la lettre ouverte : https://fr.scribd.com/document/557847088/Lettre-Ouverte-Philippe-Garrigues

Belgium set to launch its first-ever national action plan to increase health and environment protection from endocrine disrupting chemicals

Env-health 28/02/22

Health groups have welcomed Belgium's first-ever draft national action plan on endocrine disrupting chemicals (EDCs) as an important step towards better identification of and health protection against the risks associated to exposure to such harmful substances. A public consultation on the draft plan came to a close February 14th [1]. [...]

With the launch of its action plan, Belgium is joining a small group of other EU countries taking national action to address the challenge of EDC exposure through simultaneous actions on several levels: 1) increase efforts to better identify and regulate those substances at national and European levels, 2) better inform the population about EDCs to serve exposure reduction, including through training of relevant professionals in the

https://dx.doi.org/10.17180/1ag1-9f08

health and social fields and boosting substitution efforts across sectors, 3) continue to develop research to serve more accurate identification and to monitor the exposure of the population and the environment. Other countries that have already taken similar initiatives include France, Denmark and Sweden [2]. [...]

Accès au document

Pesticide Use on Crops for Meat and Dairy Feed Further Threatens Endangered Species

Beyond Pesticides, March 1, 2022

A report by the Independent finds chemical-intensive farming of crops for animal feed puts thousands of endangered species at risk. U.S. farmlands use more than 235 million pounds of pesticide (i.e., herbicides and insecticides) solely for animal feed production, many of which are highly hazardous pesticides (HHPs). Several HHP hazard categories include acutely toxic, chronic health hazards, and environmental hazards. Therefore, animal feed production intensifies global pollution, increases pesticide exposure, and degrades human, animal, and ecological health. [...]

Accès au document

Joint statement: The EU Commission must do better to transition away from synthetic pesticides

HEAL 28/02/22

Over 70 European organisations sent a joint statement to European Commission Executive Vice-President Timmermans and Health & Food Safety Commissioner Kyriakides to express their deep concern about the lack of ambition of the Commission's draft proposal for a "Sustainable Use of Plant Protection Products" Regulation to be published on 23 March. They make 10 demands to reach an ambitious Regulation. [...]

Voir aussi :

https://www.generations-futures.fr/actualites/alerte-revision-directive-pesticides/

Accès au document

Interdiction du phosmet : une mauvaise nouvelle pour l'environnement

Agriculture-Environnement 28/02/22

Bien qu'attendue, la suppression du phosmet entraîne des conséquences en cascade pour l'ensemble de la filière colza, avec une diminution des surfaces cultivées à prévoir dans les prochaines années

Depuis le retrait du Patton (chlorpyriphos-méthyl) en 2020, le phosmet représentait la dernière solution réellement efficace pour lutter contre les grosses altises du colza, un coléoptère de 3 à 5 mm baptisé Psylliodes chrysocephala, reconnaissable à son corps noir et brillant aux reflets bleu métallique. [...]

Accès au document

Statistiques agricoles : nous demandons des résultats et des actions ambitieuses

Générations futures 25/02/22

Près de 80 ONG* de toute l'Europe, dont Générations Futures, écrivent ce jour aux ministres français de l'Agriculture, de la Santé et de l'Environnement ainsi qu'aux Commissaires européens en charge de ces questions pour faire part de leurs préoccupations concernant la réforme en cours des statistiques agricoles de l'UE.

Plus précisément, nos ONG sont préoccupées par la disponibilité limitée des données d'utilisation des pesticides et autres produits chimiques toxiques dans l'agriculture. [...]

https://dx.doi.org/10.17180/1ag1-9f08

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Accès au document

Mosquito Exposed to Pesticides Can Withstand Further Pesticide Chemical Controls

Beyond Pesticides, February 24, 2022

Widespread, intensive pesticide use for mosquito control has allowed genetic mutations to persist among mosquito populations, causing subsequent resistance to future chemical exposure. According to a study published in Scientific Reports, two common species of female mosquitoes learned to evade pesticides following non-fatal exposure through smell. More concerning is the survival rate of these pre-exposed mosquitoes, as it is more than double that of unexposed mosquitoes. [...]

Accès au document

Aubert et Veillerette livrent leur vision utopique de l'agriculture biologique

Agriculture Environnement 23/02/22

Préfacé par leur ami le sénateur écologiste Joël Labbé, le dernier livre de Claude Aubert et François Veillerette a pour ambition d'expliquer comment arrêter l'usage des pesticides CL. Aubert et F. Veillerette : Pour en finir avec les pesticides : des solutions pour y parvenir. Terre vivante, janvier 2022.

[...] Claude Aubert et François Veillerette ont choisi un angle d'attaque relativement neuf.

Ainsi, pour convaincre de l'inutilité de ces produits, les deux responsables de Générations Futures prennent le parti de se focaliser sur le système immunitaire des plantes. [...]

Accès au document

Deadly Fungus Resistant to Fungicide Jumps from Farms to People, as Human Pathogen Spreads

Beyond Pesticides, February 23, 2022

Fungicide use in agriculture is driving the spread of multi-fungicide resistant human pathogens, finds a recent study conducted by scientists at the University of Georgia. While this occurrence has long been an assumption based on the rampant overuse of fungicides in chemical-dependent farming, scientists have now found clear evidence linking the development of widespread fungal resistance to farming practices, rather than health care use. Despite strong evidence that commonly used synthetic pesticides in chemical-intensive farming are driving resistance that threatens human health on a global scale, the U.S. government has not only failed to take action, it has fought against international efforts to slow the crisis, at the behest of the agrichemical industry. [...]

Accès au document

Pesticides c'est dans l'air : Un nouveau rapport exclusif de Générations Futures

Générations futures 22/02/22

Alors que le Salon International de l'Agriculture s'ouvre en fin de semaine, Générations Futures se penche sur la question de l'exposition des riverains aux pesticides agricoles et publie un nouveau rapport montrant l'inefficacité des Zones Non Traitées (ZNT) de 5 et 10 m. Notre association demande un renforcement de ces ZNT !

Selon nos premières mesures une distance de 33 mètres ne réduit même pas de moitié l'exposition aux pesticides constatée en limite de champ ! [...]

Accès au document

https://dx.doi.org/10.17180/1ag1-9f08

A history of ineffective action on BPA, and the lessons for reform of EU chemical laws

Chemtrust 22/02/22

Bisphenol A (BPA), a chemical used in coatings and certain plastics, has been controversial for many years as evidence has mounted of its endocrine disrupting effects. Two important events happened at the end of 2021 to increase the pressure on this chemical. Firstly, the EU food safety agency EFSA proposed a massive 100,000-fold reduction in the safe level for BPA in foodstuffs, and in addition, the European Court of Justice confirmed that BPA was correctly listed as a "substance of very high concern" in EU chemicals law REACH due to its endocrine disrupting properties for humans. [...]

Accès au document

Pesticide, Plastic Stabilizer among Chemicals Advanced for Stockholm Review

SAICM 19/02/22

The Persistent Organic Pollutants (POPs) Review Committee (POPRC) to the Stockholm Convention on persistent organic pollutants (POPs) has elevated five chemicals to the next stage of its review process. It also recommended that a sixth chemical be considered for elimination of production and use. [...]

Three chemicals were nominated for POPRC consideration [...] :

- Chlorpyrifos,

- Chlorinated paraffins with carbon chain lengths in the range C14-17 and chlorination levels at or exceeding 45% by weight, and

- Long-chain perfluorocarboxylic acids (LC-PFCAs), their salts and related compounds.

[...] Two chemicals were already at the Annex E stage: UV-328 and Dechlorane Plus. [...]

Finally, [...] The POPRC agreed to recommend that the COP decide to list methoxychlor under Convention Annex A, without exemptions, which would effectively eliminate its production and use.

Accès au document

PFAS Adds to the Legacy of Persistent Toxics Hurting Generations of People and the Environment

Beyond Pesticides, February 18, 2022

A new analysis conducted by Safer States, and reported on by Environmental Health News (EHN), concludes that in 2022, at least 32 states will consider 210 potential laws to ban or restrict one category of so-called "legacy" chemicals — the PFAS (per- and polyfluoroalkyl substances) family of compounds. "Legacy" or "forever" chemicals are those whose historical use, including many decades ago in some instances, has led to their toxic persistence in the environment and in organisms. In recent years, scientists, health and environment advocates, and policy makers have begun to recognize these as very serious contaminants, and to call attention to their ubiquity and impacts. [...]

Accès au document

European Parliament recognises the European Green Deal as a significant contributing factor to cancer prevention in Europe

HEAL 17/07/22

This week the European Parliament adopted its non-legislative report responding to the publication of the EU Commission 2021 communication on Europe's Beating Cancer Plan, recognising the EU Green Deal is a key tool to limit people's exposure to pollution and prevent cancer [1, 2].

[...] The report echoes HEAL's demands to: [...]

https://dx.doi.org/10.17180/1ag1-9f08

Prevent cancer from Farm to Fork and linking action to the EU Chemicals Strategy for Sustainability by reducing the use of pesticides linked to cancer, revising outdated EU legislation on food contact materials, closing the current legislative gap on endocrine disrupting chemicals (EDCs) and applying cross-sectoral coherence. EDCs should not be allowed in toys, cosmetics, food contact materials, or any other consumer products. This will guarantee that carcinogens and endocrine disrupting chemicals associated with increased cancer risk are eliminated; [...]

Accès au document

De multiples actions autour du 15 février, Journée Internationale du cancer de l'enfant

Réseau Environnement Santé 17/02/22

Le dimanche 13 février le Réseau Environnement Santé (RES), et des associations du Collectif Inter-associatif pour la Santé Environnementale (CISE), sont allés soutenir les familles des enfants victimes de cancers devant le Ministère de la Santé. Ce rassemblement s'est inscrit dans une globalité d'actions autour de la Journée Internationale du cancer de l'enfant du mardi 15 février. Le RES est notamment intervenu le 14 février à l'occasion d'une table ronde à l'Assemblée Nationale consacrée à la prévention des cancers pédiatriques, et le 16 février lors du 5ème Colloque Grandir Sans Cancer & Assemblée Nationale. [...]

André CICOLELLA, Président du RES, a rappelé que les causes environnementales sont identifiées : pesticides, pollution atmosphérique et solvants pendant la grossesse et quelques temps avant, mais le phénomène progresse de 1% par an depuis bientôt 50 ans. [...]

Accès au document

Plastic Sports Bottles Leach Thousands of Chemicals, including a Common Insect Repellent

Beyond Pesticides, February 17, 2022

Reusable plastic sports bottles can leach hundreds of different chemical substances into water, including a range of plasticizers, endocrine disruptors and surprisingly, an insect repellent. Researchers at University of Copenhagen, Denmark recently published their findings in the Journal of Hazardous Materials, calling for caution in the use of these products. [...]

Accès au document

Microplastiques : une proposition de règlement de la Commission européenne entre en consultation

Actu-environnement 23/02/2022

La Commission européenne ouvre à la consultation publique, du 22 février au 17 mai 2022, sa proposition de règlement de lutte contre la pollution par les microplastiques. Inscrite dans le cadre des plans d'action d'économie circulaire et « zéro pollution », cette initiative présente des mesures de réduction de cette pollution ainsi que des dispositions favorisant la production de connaissances scientifiques en la matière. [...]

Article réservé aux abonnés

Accès au document

La diffusion massive de plastique dans le monde illustre les limites de l'économie circulaire

Actu-environnement 22/02/22

https://dx.doi.org/10.17180/1ag1-9f08

Dans un rapport mondial, l'OCDE propose des pistes pour enrayer la diffusion des déchets en plastique dans les rivières et les océans et en appelle au renforcement de la coopération internationale pour endiguer ce fléau devenu planétaire. [...]

Entre 1950 et 2021, leur production est passée de zéro à 450 millions de tonnes. Entre 2010 et 2019, leur volume a plus que doublé. C'est ce que met en lumière le Global Plastic Outlook, substantielle étude conduite par l'Organisation de coopération et de développement économiques (OCDE). [...]

Accès au document

Santé des sols : le projet de directive européenne entre en consultation

Actu-environnement 18/02/2022

La procédure d'élaboration d'une directive européenne sur la santé des sols est lancée. Elle a débuté, ce mercredi 16 février, par l'ouverture d'un appel public à contributions d'un mois. Cet appel sera suivi d'une consultation publique de trois mois, ce deuxième trimestre. Enfin, l'adoption finale de la directive devrait avoir lieu d'ici au deuxième trimestre 2023. [...]

Article réservé aux abonnés

Accès au document

Pesticides : la grande illusion des équipements de protection des agriculteurs

Le Monde 16/02/2022

Depuis quinze ans, un groupe de chercheurs alerte en vain sur l'inefficacité de ces dispositifs. Les normes, coécrites par les industriels, ignorent autant la réalité du métier que les données scientifiques. Premier volet (sur quatre) de la série « Agriculteurs intoxiqués ».

L'étude Pestexpo a débuté il y a plus de vingt ans en Normandie et dans la région de Bordeaux. De pionniers, ces travaux sont devenus une véritable bombe scientifique contre un pilier du modèle agricole intensif : le recours massif aux pesticides. Les chercheurs à l'origine de cette étude, devenus lanceurs d'alerte, n'ont eu de cesse de transmettre données et inquiétudes aux autorités françaises et européennes. [...]

Article réservé aux abonnés

Accès au document

Sulfoxaflor : sa proposition d'interdiction rejetée, la Commission européenne fait appel

Actu-environnement 11/02/22

Pesticide nocif pour les pollinisateurs, le sulfoxaflor reste, tant bien que mal, dans le collimateur de l'Union européenne. La Commission affirme « *mener des discussions depuis un an avec les États membres à ce sujet* », mais sa proposition d'interdiction n'a pas encore abouti. Cette proposition, visant à limiter l'utilisation du pesticide seulement aux serres permanentes, a été rejetée par la « *majorité qualifiée nécessaire* » devant le comité permanent des végétaux, animaux, denrées alimentaires et aliments pour animaux de la Commission européenne. [...]

Article réservé aux abonnés

Accès au document

Statistiques sur les pesticides : un sujet très politique

Actu-environnement 11/02/22

Rejeté par le Conseil européen, le texte de la Commission sur les statistiques de l'utilisation des pesticides est en négociation dans le cadre d'un trilogue, incluant le Parlement. Des discussions techniques aux impacts politiques importants.

Il ne figure pas parmi les sujets prioritaires mentionnés par le ministre de l'Agriculture, dans le cadre de la Présidence française de l'Union

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européenne. Le projet de texte législatif communautaire relatif aux statistiques sur les pesticides, dit SAIO (Statistics on Agricultural Input and Output), devra pourtant mobiliser les équipes de Julien Denormandie, puisque la France est aux manettes du trilogue (Parlement, Commission, Conseil) ouvert, le 3 février dernier ...

Article réservé aux abonnés

Accès au document

Lanceurs d'alerte : la nouvelle loi devrait contribuer à combattre les atteintes à l'environnement

Actu-envrionnement 3/02/22

L'accord trouvé en commission mixte paritaire ouvre la voie à l'adoption d'une nouvelle loi sur la protection des lanceurs d'alerte. Ce texte devrait permettre de mieux protéger ceux qui signalent des dysfonctionnements portant atteinte à l'environnement. [...]

Accès au document

Effondrement de la biodiversité : l'État attaqué en justice

Reporterre 11/01/2022

« Nous attaquons l'État pour manquement à ses obligations de protection de la biodiversité. » C'est par ces mots que Julie Pecheur, directrice du plaidoyer à Pollinis, a annoncé le recours déposé par Pollinis, Notre affaire à tous, l'Aspas, Anper-TOS [1] et Biodiversité sous nos pieds au tribunal administratif de Paris, lundi 10 janvier.

Par cette démarche, première du genre dans le monde entier et qui s'inscrit dans la continuité de l'Affaire du siècle pour le climat, les associations visent le système français d'évaluation et d'autorisation de mise sur le marché des pesticides. [...]

Accès au document

Pesticides : le lien se précise avec la maladie de Parkinson, grâce à des mouches

Actu-environnement 07/02/22

L'utilisation de nombreux pesticides, comme le roténone ou les dithiocarbamates, augmente le risque de souffrir de la maladie de Parkinson. Si le lien a été établi depuis plusieurs années, la façon dont ces produits induisent ou accentuent cette neurodégénérescence reste flou. Dans une étude, publiée en octobre dernier, dans l'*International Journal of Molecular Sciences*, des chercheurs de l'École normale supérieure de Lyon et du laboratoire local de l'Agence nationale de sécurité...

Article réservé aux abonnés

Accès au document

Glyphosate : ces controverses qui empoisonnent le débat

Actu-environnement 02/02/22

Décrié par les uns, défendu par les autres, le glyphosate est depuis des années au centre de nombreux débats et de visions différentes de la société. Un consensus méthodologique sera-t-il possible ? Difficile de l'imaginer dans l'immédiat.

Analyses contradictoires, appels à la justice… Après la publication par l'association Campagne Glyphosate, dans la revue *Environmental Science and Pollution Research*, en janvier dernier, des résultats de ses dépistages de l'herbicide dans les urines de milliers de volontaires, les agriculteurs contre-attaquent. « *Campagne Glyphosate ment avec de faux tests*, accusaient la FRSEA de Bretagne *et la FNSEA du Val-de-Loire, lors d'une conférence de presse, le 19 janvier dernier. C'est la tentative de trop !* »

Accès au document

https://dx.doi.org/10.17180/1ag1-9f08

Néonicotinoïdes : le traitement des betteraves à nouveau temporairement autorisé

Actu-environnement 1/02/22

Conformément à sa volonté d'empêcher une nouvelle émergence massive de la jaunisse de la betterave, le gouvernement autorise, cette année encore, le traitement des semences aux néonicotinoïdes. Cette nouvelle dérogation annuelle, prévue par la loi du 14 décembre 2020 et validée par le Conseil de surveillance des néonicotinoïdes, s'applique dès à présent par le biais d'un arrêté publié, ce mardi 1er février, au *Journal officiel*. La mesure autorise, pour une durée de cent-vingt...

Article réservé aux abonnés

Accès au document

Pesticides : le gouvernement ne répond pas à l'injonction du Conseil d'Etat de « mieux protéger la population »

Le Monde 26/01/2022

Le texte publié le 26 janvier n'augmente pas les distances de sécurité pour les produits suspectés d'être cancérogènes, mutagènes ou reprotoxiques, comme l'avait demandé le juge administratif.

Dans une décision rendue le 26 juillet 2021, le Conseil d'Etat avait ordonné au gouvernement de compléter les règles d'utilisation des pesticides, afin de « *mieux protéger la population* ». [...] Cependant, les textes ne répondent que très partiellement à l'injonction du Conseil d'Etat.

Article réservé aux abonnés

Accès au document

Pesticides non approuvés dans l'UE : un projet de décret fixe les modalités de leurs délais de grâce

Actu-environnement 20/01/22

À quand l'interdiction effective, en France, de la production, du stockage et de la circulation des pesticides non approuvés sur le plan européen ? L'article 83 de la loi Egalim fixait l'entrée en vigueur de cette interdiction au 1er janvier 2022. Plus de trois ans après le vote du texte, le ministère de la Transition écologique vient seulement d'ouvrir une consultation publique sur un projet de décret précisant comment seront fixés les délais accordés, « *à titre transitoire* », à ces substances jugées dangereuses. [...]

Article réservé aux abonnés

Accès au document

Composés perfluorés : l'Echa en faveur d'une restriction des PFHxA

Actu-environnement 3/01/21

Le comité d'évaluation des risques et le comité d'analyse socio-économique de l'Agence européenne des produits chimiques (Echa) se sont prononcés, le 9 décembre, en faveur d'une restriction d'utilisation de l'acide perfluorohexanoïque (PFHxA), ses sels et les substances apparentées. [...]

Article réservé aux abonnés

Accès au document

Bisphénol A : la justice européenne confirme son caractère de perturbateur endocrinien

Actu-environnement 4/01/22

Par une décision du 21 décembre 2021, la Cour de justice de l'Union européenne (CJUE) a rejeté le pourvoi de Plastics Europe, association des

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producteurs de plastiques, qui contestait le classement du bisphénol A (BPA) en tant que substance extrêmement préoccupante (SVHC) au titre de ses propriétés de perturbateur endocrinien. [...]

Article réservé aux abonnés

Accès au document

Les grands enjeux de l'agriculture numérique : équipements, modèles agricoles, big data - Analyse n° 171

Ministère de l'Agriculture 11/01/22

À l'image de la société et des autres secteurs économiques, le numérique se diffuse progressivement dans le quotidien des agriculteurs, leurs équipements et les services qui leur sont proposés. Les débats portent autant sur les réponses que cette agriculture numérique peut apporter aux défis économiques, alimentaires et environnementaux que sur les craintes qu'elle suscite. Alors que les données, fruits de cette digitalisation, sont très convoitées par divers acteurs, dont les grandes entreprises du numérique, des stratégies publiques se mettent en place pour une plus grande régulation de l'accès à ces données. Cette note analyse ces divers aspects.

Les grands enjeux de l'agriculture numérique : équipements, modèles agricoles, big data - Analyse n° 171 (PDF, 1.6 Mo) en PJ

Accès au document

Sulfoxaflor : la Cour d'appel de Marseille confirme l'interdiction de deux insecticides

Actu-environnement 10/01/2022

Sans trop de surprises, la Cour administrative d'appel de Marseille a confirmé l'interdiction de deux insecticides contenant du sulfoxaflor, le Closer et le Transform. A la demande de trois associations, Générations futures, l'Union nationale de l'apiculture française (Unaf) et l'association Agir pour l'environnement, en décembre 2019, le tribunal administratif de Nice avait annulé les autorisations de mise sur le marché (AMM). ...

Article réservé aux abonnés

Accès au document