

Bulletin Board

Contents

OCT. 08, 2021

[click on page numbers for links]

CHEMICAL EFFECTS

Neurodevelopmental toxicity of alumina nanoparticles to zebrafish larvae: Toxic effects of particle sizes and ions.....	3
Application of 96-well plate SPE method for analysis of persistent organic pollutants in low volume blood serum samples	3
Mixture toxicity, cumulative risk, and environmental justice in United States federal policy, 1980-2016 : Why, with much known, was little done?	4
Gastrointestinal tract and skin permeability of chemicals in consumer products using parallel artificial membrane permeability assay (PAMPA).....	5

ENVIRONMENTAL RESEARCH

Concentrations, distribution and potential health risks of organic ultraviolet absorbents in street dust from Tianjin, a megacity in northern China.....	6
A Modelling Study on PM 2.5-Related Health Impacts from Climate Change and Air Pollution Emission Control - China, 2010s and 2040s.....	7
Environmental and health impacts of spraying COVID-19 disinfectants with associated challenges.....	7

OCCUPATIONAL

Exposure to pesticides or agroecological practices: suicidal ideation among peasant farmers in Brazil's semi-arid region	8
Respiratory symptoms related to flour dust exposure are significantly high among small and medium scale flour mill workers in Ethiopia: a comparative cross-sectional survey	9

PHARMACEUTICAL/TOXICOLOGY

Perinatal exposure to endocrine disrupting chemicals and neurodevelopment: How articles of daily use influence the development of our children.....	11
---	----

CONTACT US

subscribers@chemwatch.net
tel +61 3 9572 4700
fax +61 3 9572 4777

1227 Glen Huntly Rd
Glen Huntly
Victoria 3163 Australia

Bulletin Board

Technical

OCT. 08, 2021

CHEMICAL EFFECTS

Neurodevelopmental toxicity of alumina nanoparticles to zebrafish larvae: Toxic effects of particle sizes and ions

2021-09-27

The aim of this study was to explore the mechanism of neurodevelopmental toxicity of alumina nanoparticles (AINPs) on zebrafish larvae, specifically, the toxic effects of AINPs of different particle sizes and of dissolved aluminum ions. AINPs with sizes of 13 nm (13 nm-AI) and 50 nm (50 nm-AI) were used as the main research objects; while nanocarbon particles with sizes of 13 nm (13 nm-C) and 50 nm (50 nm-C) as particle-size controls; and an aluminum chloride solution (Al³⁺) as an ion control. Zebrafish embryos were exposed to different treatments from 6 h post-fertilization (hpf) to 168 hpf. Deformities were observed at different time points. Neurodevelopmental behavior tests were carried out, and oxidative stress responses and transcriptional alterations in autophagy-related genes were assessed. Malformations occurred in the 13 nm-AI, 50 nm-AI, and Al³⁺ treated groups at different developmental stages of zebrafish larval, but no malformations were observed in the 13 nm-C or 50 nm-C groups. In addition, the average speed, distance travelled and thigmotaxis in zebrafish larvae decreased in the AINPs treated group, and the effects were related to the particle sizes. Furthermore, increases in the oxidative stress response and autophagy-related genes expression were also related to the particle sizes of AINPs as well. In conclusion, the mechanism underlying the neurodevelopmental toxicity of AINPs on zebrafish larvae mainly depended on the size of the nanoparticles, and dissolved Al³⁺ also contributes to the toxic effects.

Authors: Rong Fan, Jin Chen, Xiaocheng Gao, Qinli Zhang

Full Source: Food and chemical toxicology : an international journal published for the British Industrial Biological Research Association 2021 Sep 27;112587. doi: 10.1016/j.fct.2021.112587.

Application of 96-well plate SPE method for analysis of persistent organic pollutants in low volume blood serum samples

2021-09-20

Though many persistent organic pollutants (POPs) are closely regulated the human population is still exposed to these ubiquitous chemicals from the environment and diet. Safe management and human biomonitoring of POPs is necessary to understand the risk of exposure. Within

Bulletin Board

Technical

OCT. 08, 2021

human biomonitoring the mass of sample is often limited, therefore robust methods using smaller sample amounts are necessary. This study developed a 96-well plate solid phase extraction (SPE) method for determination of selected POPs: polychlorinated biphenyls (PCBs), organochlorine pesticides (OCPs), polybrominated diphenyl ethers (PBDEs), hexabromocyclododecane (HBCD) and non-persistent novel flame retardants (NFRs) in low volume blood serum. Non-destructive clean-up coupling Oasis HLB extraction plate with Phree phospholipid removal plate was employed. Extraction efficiency was determined at low and high concentrations in certified reference materials NIST SRM 1957 and 1958, respectively. Target compounds deviated from certified values on average by 15% and 21% for SRM 1957 and SRM 1958, respectively. Observed limit of detections (LODs) ranged from 0.36 pg/mL (PCB 180) to 66.07 pg/mL (D-HCH). The applicability for real samples is demonstrated on 48 samples from pregnant women enrolled in the pilot phase of the CELSPAC: TNG study. In total, 30 target compounds were detected in at least one sample. The method developed here provides a fast and reliable analysis of human blood serum with possibility to introduce automation for the sample preparation procedure.

Authors: Jiří Palát, Petr Kukučka, Garry P Codling, Elliott J Price, Petr Janků, Jana Klánová

Full Source: Chemosphere 2021 Sep 20;287(Pt 3):132300. doi: 10.1016/j.chemosphere.2021.132300.

Mixture toxicity, cumulative risk, and environmental justice in United States federal policy, 1980-2016 : Why, with much known, was little done?

2021-09-17

Toxic chemicals - "toxicants" - have been studied and regulated as single entities, and, carcinogens aside, almost all toxicants, single or mixed and however altered, have been thought harmless in very low doses or very weak concentrations. Yet much work in recent decades has shown that toxicants can injure wildlife, laboratory animals, and humans following exposures previously expected to be harmless. Additional work has shown that toxicants can act not only individually and cumulatively but also collectively and even synergistically and that they affect disadvantaged communities inordinately - and therefore, as argued by reformers, unjustly. As late as December 2016, the last full month before the inauguration of a president promising to rescind major environmental regulations, the United States federal environmental-health establishment, as led by the Environmental Protection Agency (EPA), had not developed coherent

Toxic chemicals - "toxicants" - have been studied and regulated as single entities, and, carcinogens aside, almost all toxicants, single or mixed and however altered, have been thought harmless in very low doses or very weak concentrations.

Bulletin Board

Technical

OCT. 08, 2021

strategies to mitigate such risks, to alert the public to their plausibility, or to advise leadership in government and industry about their implications. To understand why, we examined archival materials, reviewed online databases, read internal industry communications, and interviewed experts. We confirmed that external constraints, statutory and judicial, had been in place prior to EPA's earliest interest in mixture toxicity, but we found no overt effort, certainly no successful effort, to loosen those constraints. We also found internal constraints: concerns that fully committing to the study of complex mixtures involving numerous toxicants would lead to methodological drift within the toxicological community and that trying to act on insights from such study could lead only to regulatory futility. Interaction of these constraints, external and internal, shielded the EPA by circumscribing its responsibilities and by impeding movement toward paradigmatic adjustment, but it also perpetuated scientifically dubious policies, such as those limiting the evaluation of commercial chemical formulations, including pesticide formulations, to only those ingredients said by their manufacturers to be active. In this context, regulators' disregard of synergism contrasted irreconcilably with biocide manufacturers' understanding that synergism enhanced lethality and patentability. In the end, an effective national response to mixture toxicity, cumulative risk, and environmental injustice did not emerge. In parallel, though, the National Institute of Environmental Health Sciences, which was less constrained, pursued with scientific investigation what the EPA had not pursued with regulatory action.

Authors: Robert Hunt Sprinkle, Devon C Payne-Sturges

Full Source: Environmental health : a global access science source 2021 Sep 17;20(1):104. doi: 10.1186/s12940-021-00764-5.

Gastrointestinal tract and skin permeability of chemicals in consumer products using parallel artificial membrane permeability assay (PAMPA)

2021-09

Some chemicals commonly used in personal care products, household items, food vessels, cosmetics, and other consumer products are potentially harmful, and several reviews of epidemiological studies have suggested the associations between the chemical exposure from consumer products, and respiratory diseases, skin sensitization, and reproductive problems. Therefore, risk assessment is essential for management of consumer products safety. Necessarily, the estimation of human exposure is an essential step in risk assessment, and the absorption rate of those chemicals via the gastrointestinal tract,

Some chemicals commonly used in personal care products, household items, food vessels, cosmetics, and other consumer products are potentially harmful, and several reviews of epidemiological studies have suggested the associations between the chemical exposure from consumer products, and respiratory diseases, skin sensitization, and reproductive problems.

Bulletin Board

Technical

OCT. 08, 2021

respiratory tract, and skin are very critical in determining the internal dose of the exposed chemicals. In this study, parallel artificial membrane permeability assays (PAMPA) for the gastrointestinal tract and skin were performed to evaluate the permeability of parabens (4-hydroxybenzoic acid, methyl-, propyl-, and butyl paraben), bisphenols (bisphenol A, bisphenol F, and bisphenol S), isothiazolinones (methyl-, chloromethyl-, benz-, octyl-, and dichlorooctyl isothiazolinone), and phthalates [diethyl-, dibutyl-, Di-isononyl-, and bis(2-ethylhexyl) phthalate]. Lipid solubility of test chemicals indicated by log P values was shown as the most critical factor and showed a positive association with the permeability of parabens, bisphenols, and isothiazolinones in PAMPA assay. However, phthalate showed a reverse-association between lipophilicity and permeability. The permeability of all the tested chemicals was higher in the gastrointestinal tract membrane than in the skin membrane. The pH in donor solution did not show significant effects on the permeability in all the chemicals, except the chemicals with a free hydrophilic moiety in their chemical structures.

Authors: Juyoung Park, Handule Lee, Kwangsik Park

Full Source: Environmental analysis, health and toxicology 2021 Sep;36(3):e2021021-0. doi: 10.5620/eaht.2021021.

ENVIRONMENTAL RESEARCH

Concentrations, distribution and potential health risks of organic ultraviolet absorbents in street dust from Tianjin, a megacity in northern China

2021-09-25

The distribution of organic ultraviolet absorbents (OUVAs) in outdoor dust remains poorly understood, especially in megacities. We measured the concentrations of 11 OUVAs in street dust from Tianjin, China, by a gas chromatography-mass spectrometry, and found total concentrations in the range of 10.3-129 ng/g. These OUVAs were prevalent in the study street dust, but their concentrations were much lower than those in indoor dust reported in other areas previously. Benzophenone and octocrylene were the dominant OUVAs, representing medians of 15.5% and 13.1% of total OUVA concentrations, respectively. Total concentrations of dust OUVAs in the industrial area were higher than the residential, cultural and new urban areas. Source assessment indicated that the OUVAs likely originated mainly from the manufacture and consumption of cosmetics and personal care products, and some may have been from the production and use of OUVA-containing consumer products. The calculated non-carcinogenic

The distribution of organic ultraviolet absorbers (OUVAs) in outdoor dust remains poorly understood, especially in megacities.

Bulletin Board

Technical

OCT. 08, 2021

risks of OUVAs in street dust were low. Our results further confirmed that the OUVAs were prevalent in the environment, provide useful information for understanding potential risks of these chemicals and developing risk management strategies. Further studies are needed to investigate the occurrence, environmental behaviors and potential risks of these emerging contaminants in outdoor environment.

Authors: Di An, Xiangyang Xing, Zhenwu Tang, Yonghong Li, Jiazheng Sun
Full Source: Environmental research 2021 Sep 25;204(Pt B):112130.
doi: 10.1016/j.envres.2021.112130.

A Modelling Study on PM 2.5-Related Health Impacts from Climate Change and Air Pollution Emission Control - China, 2010s and 2040s

2021-06-04

What is already known about this topic?

Climate change and air pollution are two important environmental issues in China. It is important to investigate particulate matter with aerodynamic diameter less than 2.5 μm (PM_{2.5})-related health impacts from climate change and air pollution emission control. What is added by this report? Deaths and years of life lost related to PM_{2.5} would increase in climate change scenario, although emission control would outweigh the influence of climate change.

What are the implications for public health practice?

More targeted actions should be taken to meet challenges of exacerbated PM_{2.5} pollutions and its health impacts related to climate change in the future.

Authors: Jing Huang, Heng Tian, Jiawei Wang, Teng Yang, Yiran Peng, Shaowei Wu, Tzung-May Fu, Guoxing Li

Full Source: China CDC weekly 2021 Jun 4;3(23):500-506. doi: 10.46234/ccdcw2021.128.

Environmental and health impacts of spraying COVID-19 disinfectants with associated challenges

2021-10-01

Coronavirus refers to a group of widespread viruses. The name refers to the specific morphology of these viruses because their spikes look like a crown under an electron microscope. The outbreak of coronavirus disease 2019 (COVID-19) that has been reported in Wuhan, China, in December 2019, was proclaimed an international public health emergency (PHEIC) on 30 January 2020, and on 11 March 2020,

Bulletin Board

Technical

OCT. 08, 2021

it was declared as a pandemic (World Health Organization 2020). The official name of the virus was declared by the WHO as "COVID-19 virus", formerly known as "2019-nCoV", or "Wuhan Coronavirus". The International Committee on Virus Taxonomy's Coronavirus Research Group has identified that this virus is a form of coronavirus that caused a severe outbreak of acute respiratory syndrome in 2002-2003 (SARS). As a result, the latest severe acute respiratory syndrome has been classified as a corona virus 2 (SARS-CoV-2) pathogen by this committee. This disease spread quickly across the country and the world within the first 3 months of the outbreak and became a global pandemic. To stop COVID-19 from spreading, the governing agencies used various chemicals to disinfect different commercial spaces, streets and highways. However, people used it aggressively because of panic conditions, anxiety and unconsciousness, which can have a detrimental impact on human health and the environment. Our water bodies, soil and air have been polluted by disinfectants, forming secondary products that can be poisonous and mutagenic. In the prevention and spread of COVID-19, disinfection is crucial, but disinfection should be carried out with sufficient precautions to minimize exposure to harmful by-products. In addition, to prevent inhalation, adequate personal protective equipment should be worn and chemical usage, concentrations, ventilation in the room and application techniques should be carefully considered. In the USA, 60% of respondents said they cleaned or disinfected their homes more often than they had in the previous months. In addition to the robust use of disinfection approaches to combat COVID-19, we will explore safe preventative solutions here.

Authors: Shakeel Ahmad Bhat, Farooq Sher, Rohitashw Kumar, Emina Karahmet, Syed Anam Ul Haq, Ayesha Zafar, Eder C Lima
Full Source: Environmental science and pollution research international 2021 Oct 1. doi: 10.1007/s11356-021-16575-7.

OCCUPATIONAL

Exposure to pesticides or agroecological practices: suicidal ideation among peasant farmers in Brazil's semi-arid region

2021-09

Health risks faced by peasant farmers may vary depending on the type of agriculture they practice. This study examined the association between suicide ideation and exposure to pesticides by comparing two groups of

Health risks faced by peasant farmers may vary depending on the type of agriculture they practice.

Bulletin Board

Technical

OCT. 08, 2021

peasant farmers of both sexes living in the semi-arid region of the north of Minas Gerais, Brazil: exposed to pesticides and adopting agroecological practices without the use of pesticides. Group participants were selected using convenience sampling and data was collected using a previously validated questionnaire administered through face-to-face interviews. Bivariate analysis was performed, followed by logistic regression. A total of 547 peasant farmers were interviewed (311 in the group exposed to pesticides and 236 in the group adopting agroecological practices). Respondents from the group exposed to pesticides were more likely to report suicidal ideation (OR=2.30; 95%CI 1.16-4.56), harmful alcohol consumption (OR=2.30; 95%CI 1.18-4.48), and lifetime acute pesticide poisoning (OR=8.58; 95%CI 2.98-24.72). The findings suggest that agricultural practices that lead to chronic pesticide exposure are associated with a greater likelihood of suicide ideation, regardless of previous episodes of acute pesticide poisoning or harmful alcohol consumption.

Authors: Carla Wernecke Padovani Gonzaga, Marcelo Perim Baldo, Antônio Prates Caldeira

Full Source: *Ciencia & saude coletiva* 2021 Sep;26(9):4243-4252. doi: 10.1590/1413-81232021269.09052020.

Respiratory symptoms related to flour dust exposure are significantly high among small and medium scale flour mill workers in Ethiopia: a comparative cross-sectional survey

2021-09-29

Background: International Labour Organization (ILO) report indicates more than 2.4 million workers die from work-related diseases and accidents each year. Work-related respiratory ailments related to airborne particulate matter such as flour dust are responsible for about 386,000 deaths and 6.6 million illness-adjusted life years. Even though exposure to flour dust together with the extreme expansions of flour mill sectors is a priority health concern, extent of the problem is little investigated in Ethiopia. The aim of this study was to evaluate the magnitude and risk factors of work-related respiratory symptoms among flour mill workers in Bahir Dar City, Ethiopia.

Methods: This study employed a comparative cross-sectional survey of 560 samples (280 exposed group from flour mill workers and 280 unexposed group from office workers) with a stratified random sampling technique. The study was conducted from March to April 2019 in Bahir Dar City, Northwest Ethiopia. We used the British Medical Research

Bulletin Board

Technical

OCT. 08, 2021

Council (BMRC) questionnaire to assess work-related respiratory symptoms. The questionnaire was pretested and interview administered to collect data. Binary logistic regression analysis was fitted to evaluate significant factors of respiratory symptoms at a < 0.05 p value. Adjusted odds ratio (AOR) with a confidence interval (CI) of 95% was calculated to determine a strength of association.

Results: All the sampled participants had fully responded to the interview. The median age of exposed and unexposed groups was 28.5 interquartile range (IQR, 20) and 31 (IQR, 15) years, respectively. The prevalence of work-related respiratory symptoms among flour mill workers was substantially higher than that of among controls, 63.9% and 20.7%, respectively ($\chi^2 = 107.11$; $p < 0.0001$). Chest illness among flour mill workers was higher, 43.6% (N = 122) compared to that of among control group, 7.9% (N = 22) followed by dyspnea, 33.6% (N = 94) versus 2.5% (N = 7) among flour mill workers and control group, respectively. Age > 35 years [AOR, 2.03; 95% CI (1.34, 5.48)], having no education [AOR, 1.54; 95% CI (1.28, 3.06)], work set up with inadequate ventilation [AOR, 2.05; 95% CI (1.18, 3.56)], work experience > 5 years [AOR, 1.89; 95% CI (1.23, 4.67)] and having no training in safety [AOR, 2.45; 95% CI (1.45, 4.76)] significantly affected the experience of respiratory symptoms among flour mill workers whereas age [AOR, 1.79; 95% CI (1.06, 3.04)], monthly salary [AOR, 1.98; 95% CI (1.04, 3.78)] and exposure status [AOR, 5.18; 95% CI (3.34, 8.04)] were detected to be significant factors of respiratory symptoms in the exposed and the unexposed combined model. Conclusion: Respiratory symptoms emanating from exposure to various flour dusts were significantly higher among flour mill workers than among the control group. Therefore, we recommend the need to effectively implement health and safety programs that account for the reduction of dust at a source, use of engineering controls (e.g., provision of adequate ventilation systems), use of administrative measures (e.g., training program and health surveillance) and provision of a suitable personal protective equipment (PPE). Furthermore, it is vital to integrate workplace health and safety programs to the wider public health policies and strategies to effectively mitigate the burden of work-related respiratory conditions. We also encourage future studies to evaluate concentration of flour dusts combined with physical examinations to establish plausible associations of respiratory symptoms with dusts of flour mill-related origin.

Authors: Tesfaye Hambisa Mekonnen, Awrajaw Dessie, Amensisa Hailu Tesfaye

Full Source: *Environmental health and preventive medicine* 2021 Sep 29;26(1):96. doi: 10.1186/s12199-021-01019-y.

Bulletin Board

Technical

OCT. 08, 2021

PHARAMACEUTICAL/TOXICOLOGY

Perinatal exposure to endocrine disrupting chemicals and neurodevelopment: How articles of daily use influence the development of our children

2021-09-04

Substances that interfere with the body's hormonal balance or their function are called endocrine disrupting chemicals (EDCs). Many EDCs are ubiquitous in the environment and are an unavoidable aspect of daily life, including during early embryogenesis. Developmental exposure to these chemicals is of critical relevance, as EDCs can permanently alter developmental programs, including those that pattern and wire the brain. Of emerging interest is how these chemicals may also affect the immune response, given the cross-talk between the endocrine and immune systems. As brain development is strongly dependent on hormones including thyroid, androgens, and estrogens, and can also be affected by immunomodulation, this complicated interplay may have long-lasting neurodevelopmental consequences. This review focuses on data available from human cohorts, in vivo models, and in vitro assays regarding the impact of EDCs after a gestational and/or lactational exposure, and how they may impact the immune system and/or neurodevelopment.

Authors: Katherine L O'Shaughnessy, Florence Fischer, Ana C Zenclussen
Full Source: Best practice & research. Clinical endocrinology & metabolism 2021 Sep 4;101568. doi: 10.1016/j.beem.2021.101568.

Substances that interfere with the body's hormonal balance or their function are called endocrine disrupting chemicals (EDCs).