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ENVIRONMENTAL RESEARCH

Occurrence, fate and risk assessment of BPA and its substituents in wastewater treatment plant: A review

2019-11-14

Several bisphenol analogues (BPs) are gradually replacing bisphenol A (BPA) in many fields, following strict restrictions on the production and use of BPA. The presence of micropollutants in wastewater treatment plants (WWTPs) may pose risks to the aquatic ecosystem and human health. In this review, the authors outlined the occurrence and fate of BPs in WWTPs, and estimated their potential risks to the aquatic ecosystem. BPA is still the most predominant bisphenol analogue in WWTPs with high detection rate and concentration, followed by bisphenol S (BPS) and F (BPF). Biodegradation and adsorption are the main removal pathways for removal of BPs in WWTPs. The secondary (activated sludge process, biological aerated filter, and membrane bioreactor) and advanced (membrane technique, ultraviolet disinfection, adsorption process, and ozonation) treatment processes show high removal efficiency for BPs, which are influenced by many factors such as sludge retention time and redox conditions. BPs other than BPA (assessed in this review) in effluent of WWTPs have low risks to *Daphnia magna* and early life stages on medaka, while BPA shows a medium or high risk under certain conditions. Knowledge gaps have been identified and future line of research on this class of chemicals in WWTPs is recommended. More data are needed to illustrate the occurrence and fate of BPs in WWTPs. Environmental risks of BPs other than BPA initiating from wastewater discharge to aquatic organisms remain largely unknown.

Authors: Hu Y, Zhu Q, Yan X, Liao C, Jiang G.

Full Source: Environmental Research. 2019 Nov; 178:108732. doi: 10.1016/j.envres.2019.108732. Epub 2019 Sep 7.

Lab-scale anaerobic digestion of cassava peels: A first step of energy recovery from cassava waste and water hyacinth

2019-11-14

Cassava processing in Republic of Benin, which is used to produce different food products, generates a large amount of polluting organic matter into the environment in the form of peels and wastewater. Besides, water hyacinth a rich nitrogen plant invades Benin water streams leading in aquatic ecosystem asphyxia and blocks the navigation. Both cassava waste and water hyacinth show a high biodegradable content

In this review, the authors outlined the occurrence and fate of bisphenol analogues in wastewater treatment plants, and estimated their potential risks to the aquatic ecosystem.

enable to be treated by anaerobic digestion technology. According to the literature, the main challenge in cassava waste anaerobic digestion is early inhibition caused by a rapid acidification due to low nitrogen and high biodegradable sugars content. This study focused on the theoretical and biochemical methanogenic potential determination which is an essential step of recovery energy on large scale of both substrates through anaerobic digestion. Stoichiometric methanogenic potentials of cassava waste are close to the values obtained experimentally. However, it was necessary to treat cassava peels with «akanwu» potash and phosphate buffer pH 7.2 to cassava peels (CP) vial to reach the maximum methane yield. Average cumulative methane yield was 368 mL/gVS; 309 mL /gVS and 178 mL /gVS respectively for cassava wastewater (CWW), cassava peels and water hyacinth (WH). Co-digestion of cassava peels with water hyacinth yielded on average 211 mL/gVS of methane. Despite methane yield of co-digestion was lower than the summative of methane yield of each substrate, the process has removed the chemicals products then improved cassava peels treatment. In addition, the methane yield of water hyacinth increased by 10% when co-digested with cassava peels.

Authors: Ahou YS, Bautista Angeli JR, Awad S, Baba-Moussa L, Andres Y.
Full Source: Environmental Technology. 2019 Sep 20:1-22. doi: 10.1080/09593330.2019.1670266. [Epub ahead of print]

Hazardous waste characterization implications of updating the toxicity characteristic list

2019-11-14

In the United States, the toxicity characteristic leaching procedure (TCLP) determines if a waste is toxicity characteristic (TC) hazardous based on leached concentrations of specific chemicals. The TC limits were originally derived from drinking water standards (DWS) adjusted by a dilution attenuation factor of 100. The TC limits have not been updated along with DWS revisions. This research examines potential implications of updating the TC limits to account for new DWS thresholds and elements, as well as tap-water risk thresholds; this allows a further expanded evaluation of elements that might be regulated as drinking water standards in the future. Fossil fuel combustion residues, batteries, electronic wastes, municipal solid waste incineration (MSWI) ashes, and treated wood were examined with TCLP and the leached metal concentrations were compared to revised TC thresholds. The two wastes most affected by updated TC limits would be batteries and MSWI ashes. Thallium and antimony, which were not included on the original TC list, exceeded the TC thresholds for batteries and MSWI ash, respectively. Copper, a chemical

In the United States, the toxicity characteristic leaching procedure (TCLP) determines if a waste is toxicity characteristic (TC) hazardous based on leached concentrations of specific chemicals.

used in current preserved wood formulations, did not cause currently marketed treated wood to be hazardous waste, but arsenic did for older wood products.

Authors: Intrakamhaeng V, Clavier KA, Townsend TG.

Full Source: Journal of Hazardous Materials. 2019 Sep 7; 383:121171. doi: 10.1016/j.jhazmat.2019.121171. [Epub ahead of print]

Evaluation of bioaerosol samplers for the detection and quantification of influenza virus from artificial aerosols and influenza virus-infected ferrets

2019-11-14

Bioaerosol sampling devices are necessary for the characterisation of infectious bioaerosols emitted by naturally-infected hosts with acute respiratory virus infections. Assessment of these devices under multiple experimental conditions will provide insight for device use. The primary objective of this study was to assess and compare bioaerosol sampling devices using a) an in vitro, environmentally-controlled artificial bioaerosol system at a range of different RH conditions and b) an in vivo bioaerosol system of influenza virus-infected ferrets under controlled environmental conditions. Secondly, we also sought to examine the impact of NSAIDs on bioaerosol emission in influenza virus-infected ferrets to address its potential as a determinant of bioaerosol emission. The authors examined the performance of low and moderate volume bioaerosol samplers for the collection of viral RNA and infectious influenza virus in vitro and in vivo using artificial bioaerosols and the ferret model of influenza virus infection. The following samplers were tested: the polytetrafluoroethylene filter (PTFE filter), the 2-stage National Institute of Occupational Safety and Health cyclone sampler (NIOSH cyclone sampler) and the 6-stage viable Andersen impactor (Andersen impactor). The PTFE filter and NIOSH cyclone sampler collected similar amounts of viral RNA and infectious virus from artificially-generated aerosols under a range of relative humidities (RH). Using the ferret model, the PTFE filter, NIOSH cyclone sampler and the Andersen impactor collected up to 3.66 log₁₀ copies of RNA/L air, 3.84 log₁₀ copies of RNA/L air and 6.09 log₁₀ copies of RNA/L air respectively at peak recovery. Infectious virus was recovered from the PTFE filter and NIOSH cyclone samplers on the peak day of viral RNA recovery. The PTFE filter and NIOSH cyclone sampler are useful for influenza virus RNA

The primary objective of this study was to assess and compare bioaerosol sampling devices using an in vitro, environmentally-controlled artificial bioaerosol system at a range of different RH conditions and an in vivo bioaerosol system of influenza virus-infected ferrets under controlled environmental conditions.

and infectious virus collection and may be considered for clinical and environmental settings.

Authors: Bekking C, Yip L, Groulx N, Doggett N, Finn M, Mubareka S.

Full Source: Influenza Other Respir Viruses. 2019 Sep 21. doi: 10.1111/irv.12678. [Epub ahead of print]

Sample Treatment Methods for the Determination of Phenolic Environmental Oestrogens in Foods and Drinking Water

2019-11-14

Environmental endocrine-disrupting chemicals (EDCs) are a large category of chemicals that can disrupt normal endocrine functions of organisms. They can enter the environment and foodstuffs in different ways and bring great threat to human health. Phenolic environmental estrogens (PEEs) are the typical representatives of EDCs and include bisphenols, alkylphenols, and others such as dibromophenol, dichlorophenol, 4-nitrophenononylphenol, etc. Even trace amounts of PEEs can cause serious damage to the human reproductive, nervous, and immune systems; therefore, it is very important to develop accurate and sensitive methods for their determination in different matrixes. At the present, there are still many challenges in the determination of PEEs in the samples with complex matrixes, and the sample treatment is one of the key issues. This review deals with the recent advances in sample treatment methods for the analysis of PEEs in foods and drinking water, including improved and newly developed liquid-liquid extraction, solid-phase extraction (SPE), magnetic SPE, matrix solid-phase dispersion with new adsorbent materials, and stir-bar sorptive extraction. In addition, the challenges and perspectives are also briefly discussed.

Authors: Li Y, Yin S, Yang Y, Chen J, Wu L, Sun C.

Full Source: The Journal of AOAC INTERNATIONAL. 2019 Sep 19. doi: 10.5740/jaoacint.19-0249. [Epub ahead of print]

Tissue distribution and characterization of feline cytochrome P450 genes related to polychlorinated biphenyl exposure

2019-11-14

Cats have been known to be extremely sensitive to chemical exposures. To understand these model species' sensitivity to chemicals and their toxicities, the expression profiles of xenobiotic-metabolising enzymes should be studied. Unfortunately, the characterisation of cytochrome

This review deals with the recent advances in sample treatment methods for the analysis of PEEs in foods and drinking water

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P450 (CYP), the dominant enzyme in phase I metabolism, in cats has not extensively been studied. Polychlorinated biphenyls (PCBs) are known as CYP inducers in animals, but the information regarding the PCB-induced CYP expression in cats is limited. Therefore, in the present study, the authors aimed to elucidate the mRNA expression of the CYP1-CYP3 families in the cat tissues and to investigate the CYP mRNA expression related to PCB exposure. In cats, the greatest abundance of CYP1-CYP3 (CYP1A2, CYP2A13, CYP2C41, CYP2D6, CYP2E1, CYP2E2, CYP2F2, CYP2F5, CYP2J2, CYP2U1, and CYP3A132) was expressed in the liver, but some extrahepatic isozymes were found in the kidney (CYP1A1), heart (CYP1B1), lung (CYP2B11 and CYP2S1) and small intestine (CYP3A131). In cats, CYP1A1, CYP1A2 and CYP1B1 were significantly upregulated in the liver as well as in several tissues exposed to PCBs, indicating that these CYPs were distinctly induced by PCBs. The strong correlations between 3,3',4,4'-tetrachlorobiphenyl (CB77) and CYP1A1 and CYP1B1 mRNA expressions were noted, demonstrating that CB77 could be a potent CYP1 inducer. In addition, these CYP isoforms could play an essential role in the PCBs biotransformation, particularly 3-4 Cl-PCBs, because a high hydroxylated metabolite level of 3-4 Cl-OH-PCBs was observed in the liver. Authors: Khidkhan K, Mizukawa H, Ikenaka Y, Nakayama SMM, Nomiyama K, Yokoyama N, Ichii O, Darwish WS, Takiguchi M, Tanabe S, Ishizuka M. Full Source: Comparative Biochemistry and Physiology Part C: Toxicology & Pharmacology. 2019 Sep 2; 226:108613. doi:10.1016/j.cbpc.2019.108613. [Epub ahead of print]

This study aimed to screen for potential mutagenic activities of novel benzimidazole derivatives 1-4 using the Ames test and to study their structure-activity relationship

MEDICAL RESEARCH

Mutagenic Study of Benzimidazole Derivatives with (+S9) and without (-S9) Metabolic Activation

2019-11-14

Benzimidazole derivatives have a diverse range of biological activities, including antiulcer, antihypertensive, antiviral, antifungal, anti-inflammatory, and anticancer. Despite these activities, previous studies have revealed that some of the derivatives can induce mutations. This study aimed to screen for potential mutagenic activities of novel benzimidazole derivatives 1-4 using the Ames test and to study their structure-activity relationship (SAR). An Ames test was carried out on two strains of *Salmonella typhimurium* (TA98 and TA100) in the absence and presence of metabolic activation. Genetic analysis was performed prior to the Ames test to determine the genotypes of the bacterial tester strains. Both bacterial strains showed dependency on histidine with the

presence of *rfa* mutation, *uvrB* deletion, and plasmid pKM101. Further, all derivatives tested showed no mutagenic activity in the absence of metabolic activation in both tester strains. However, in the presence of metabolic activation, compound 1 appeared to induce mutation at 2.5 µg/plate when tested against the TA98 strain. These results suggest that the absence of the -OH group at the ortho-position over the phenyl ring might be the cause of increased mutagenic activity in compound 1. Additionally, the presence of mutagenic activity in compound 1 when it was metabolically activated indicates that this compound is a promutagen.

Authors: Azahar NH, Ab Dullah SS, Abdullah R, Ahmat N, Md Akim A, Ab Hamid H.

Full Source: International Journal of Molecular Science. 2019 Sep 4;20(18). pii: E4324. doi: 10.3390/ijms20184324.

The Impact of Twice-Daily Indacaterol/Glycopyrrolate on the Components of Health-Related Quality of Life and Dyspnoea in Patients with Moderate-to-Severe Chronic Obstructive Pulmonary Disease

2019-11-14

Chronic cough, dyspnoea, and excessive sputum production, the characteristic symptoms of chronic obstructive pulmonary disease (COPD), can negatively affect patients' health-related quality of life (HRQoL). The fixed-dose combination of a long-acting beta2-adrenergic agonist and a long-acting muscarinic antagonist (LABA/LAMA) have been shown to improve HRQoL and COPD symptoms as measured by the St George's Respiratory Questionnaire (SGRQ) and the Transition Dyspnea Index (TDI) total scores. However, the impact of a LABA/LAMA on the individual components of HRQoL and dyspnea with daily activities is unknown. Secondary analysis of pooled data from 2 replicate, phase 3, 12-week, randomised, placebo, and active-controlled trials of twice-daily indacaterol/glycopyrrolate (IND/GLY) were analysed. Change from baseline in HRQoL and dyspnoea was measured by SGRQ and TDI, respectively. Total and component scores were evaluated using linear mixed models. Logistic regression was used to analyse the proportion of patients achieving minimum clinically important difference. Study outcomes were further explored in patient subgroups. A total of 2038 patients from FLIGHT1/FLIGHT2 studies were evaluated. IND/GLY significantly improved SGRQ component scores (symptoms [-7.3], activity [-3.6], and impacts [-5.0]); all $P < 0.001$ compared with placebo. IND/GLY also significantly improved symptoms scores compared with IND and GLY (-3.5 and -3.7, respectively; both $P < 0.001$). Patients treated with IND/GLY

also had significant improvements in TDI component scores compared with placebo: functional impairment (0.48), magnitude of task (0.61), and magnitude of effort (0.54); all $P < 0.001$. All component scores were significantly higher for IND/GLY compared with IND and GLY ($P \leq 0.002$ for all). Twice-daily IND/GLY significantly improved total scores as well as components of HRQoL and dyspnoea in patients with COPD. These data demonstrate multiple clinical benefits of LABA/LAMA maintenance therapy in the COPD population.

Authors: Mahler DA, Kerwin E, Murray L, Dembek C.

Full Source: Chronic Obstructive Pulmonary Disease. 2019 Sep 19;6(4). doi: 10.15326/jcopdf.6.4.2019.0131. [Epub ahead of print]

Evaluating Chemicals for Thyroid Disruption: Opportunities and Challenges with in Vitro Testing and Adverse Outcome Pathway Approaches

2019-11-14

Extensive clinical and experimental research documents the potential for chemical disruption of thyroid hormone (TH) signalling through multiple molecular targets. Perturbation of TH signalling can lead to abnormal brain development, cognitive impairments, and other adverse outcomes in humans and wildlife. To increase chemical safety screening efficiency and reduce vertebrate animal testing, in vitro assays that identify chemical interactions with molecular targets of the thyroid system have been developed and implemented. In the present study, the authors present an adverse outcome pathway (AOP) network to link data derived from in vitro assays that measure chemical interactions with thyroid molecular targets to downstream events and adverse outcomes traditionally derived from in vivo testing. The authors examine the role of new in vitro technologies, in the context of the AOP network, in facilitating consideration of several important regulatory and biological challenges in characterizing chemicals that exert effects through a thyroid mechanism. There is a substantial body of knowledge describing chemical effects on molecular and physiological regulation of TH signalling and associated adverse outcomes. Until recently, few alternative nonanimal assays were available to interrogate chemical effects on TH signalling. With the development of these new tools, screening large libraries of chemicals for interactions with molecular targets of the thyroid is now possible. Measuring early chemical interactions with targets in the thyroid pathway provides a means of linking adverse outcomes, which may be influenced by many biological processes, to a thyroid mechanism. However, the use of in vitro assays beyond chemical screening is complicated by continuing limits in

In the present study, the authors present an adverse outcome pathway (AOP) network to link data derived from in vitro assays that measure chemical interactions with thyroid molecular targets to downstream events and adverse outcomes traditionally derived from in vivo testing.

our knowledge of TH signalling in important life stages and tissues, such as during foetal brain development. Nonetheless, the thyroid AOP network provides an ideal tool for defining causal linkages of a chemical exerting thyroid-dependent effects and identifying research needs to quantify these effects in support of regulatory decision making.

Authors: Noyes PD, Friedman KP, Browne P, Haselman JT, Gilbert ME, Hornung MW, Barone S Jr, Crofton KM, Laws SC, Stoker TE, Simmons SO, Tietge JE, Degitz SJ.

Full Source: Environmental Health Perspectives. 2019 Sep;127(9):95001. doi: 10.1289/EHP5297. Epub 2019 Sep 5.

The effect of single and combined exposures to magnetite and polymorphous silicon dioxide nanoparticles on the human A549 cell line: in vitro study

2019-11-14

The increasing trend of nanoparticle usage in science and technology has led to significant human exposure. Occupational exposure to iron oxides and silica dust has been reported in mining, manufacturing, construction, and pharmaceutical operations. The combined toxicological effects of nanoparticles and simultaneous exposure to other compounds have given rise to a new concern. The objective of this study was to investigate the toxicological effects of magnetite and polymorphous silicon dioxide nanoparticles in single and combined exposures. The polymorphous silicon dioxide nanoparticles were obtained from the milled quartz particles under 100 nm in diameter. The milled particles were purified through chloric and nitric acid wash processes. The toxic effects of the magnetite nanoparticles were investigated independently and in combination with quartz using the A549 cell line for durations of 24 and 72 h, and using diverse concentrations of 10, 50, 100, and 250 µg/mL. MTT, ROS, mitochondrial membrane potential, and cell glutathione content assays were used to evaluate the amount of cell damage in this study. The statistical significance level in one-way ANOVA and independent t test was considered to be at the 5% confidence level. The size and purity of polymorphous silicon dioxide nanoparticles were measured by TEM and ICP-OES analysis, respectively. The particles' diameters were under 100 nm and demonstrated a purity of higher than 99%. The toxicity results of this study showed a dependency on concentration and exposure duration in reducing the cell viability, cellular glutathione content, and mitochondrial membrane potential, as well as increasing the ROS generation in single and combined exposures with magnetite and polymorphous silicon dioxide nanoparticles. The toxic effects of combined exposure to these

The objective of this study was to investigate the toxicological effects of magnetite and polymorphous silicon dioxide nanoparticles in single and combined exposures.

nanoparticles were less than the single exposures, and statistically significant antagonistic interactions were detected. Combined exposure to polymorphous silicon dioxide and magnetite nanoparticles, in comparison with their single exposures, could affect health in an antagonistic manner. Since this study has been the first of its kind, further studies investigating the health effects of single and combined exposures to these compounds are needed to verify our findings. Generally, studies such as this one could contribute to the field of combined toxicity effects.

Authors: Rafieepour A, Azari MR, Khodaghali F, Jaktaji JP, Mehrabi Y, Peirovi H.

Full Source: Environmental Science & Pollution Research International. 2019 Sep 4. doi: 10.1007/s11356-019-06229-0. [Epub ahead of print]

Urinary biomarkers of phthalates exposure and risks of thyroid cancer and benign nodule

2019-11-14

Phthalates have been reported to affect the function and growth of thyroid. However, there is little data on the effect of phthalates on thyroid oncogenesis. In the present study, the authors investigated the associations between phthalates exposure and the risks of thyroid cancer and benign nodule. We sex-matched 144 thyroid cancer, 138 benign nodule patients and 144 healthy adults from Wuhan, China. Eight phthalate metabolites in spot urine samples were quantified using high-performance liquid chromatography and tandem mass spectrometry. The associations of creatinine-corrected urinary phthalate metabolites with the risks of thyroid cancer and benign nodule were assessed using multivariable logistic regression models. It was found that urinary monomethyl phthalate (MMP), mono(2-ethyl-5hydroxyhexyl) phthalate (MEHHP) and mono(2-ethylhexyl) phthalate (MEHP) were associated with increased risks of thyroid cancer and nodule, with adjusted odds ratios (ORs) ranging from 1.74 to 4.78 comparing the extreme tertiles, and urinary monobutyl phthalate (MBP) was associated with decreased risks of thyroid cancer and benign nodule (all P for trends < 0.05). Male-specific positive associations of urinary monoethyl phthalate (MEP) with thyroid cancer and nodule as well as urinary mono(2-ethyl-5-oxohexyl) phthalate (MEOHP) with thyroid cancer were also observed. These results suggest

In the present study, the authors investigated the associations between phthalates exposure and the risks of thyroid cancer and benign nodule.

Technical

CHEMWATCH

that exposure to certain phthalates may contribute to increased risks of thyroid cancer and benign nodule.

Authors: Liu C, Deng YL, Zheng TZ, Yang P, Jiang XQ, Liu EN, Miao XP, Wang LQ, Jiang M, Zeng Q.

Full Source: Journal of Hazardous Materials. 2019 Sep 9; 383:121189. doi: 10.1016/j.jhazmat.2019.121189. [Epub ahead of print]

OCCUPATIONAL RESEARCH

Occupational exposure to wood dust and risk of lung cancer: the ICARE study

2019-11-14

In a previous analysis of data from a French population-based case-control study (the Investigation of occupational and environmental Causes of Respiratory cancers (ICARE) study), 'having ever worked' in wood-related occupations was associated with excess lung cancer risk after adjusting for smoking but not for occupational factors. The present study aimed to investigate the relationship between lung cancer risk and wood dust exposure after adjusting for occupational exposures. Data were obtained from 2276 cases and 2780 controls on smoking habits and lifelong occupational history, using a standardised questionnaire with a job-specific questionnaire for wood dust exposure. Logistic regression models were used to calculate ORs and 95% CIs adjusted for age, area of residence, tobacco smoking, the number of job periods and exposure to silica, asbestos and diesel motor exhaust (DME). No significant association was found between lung cancer and wood dust exposure after adjustment for smoking, asbestos, silica and DME exposures. The risk of lung cancer was slightly increased among those who were exposed to wood dust more than 10 years, and had over 40 years since the first exposure. The authors concluded that the findings do not provide a strong support to the hypothesis that wood dust exposure is a risk factor for lung cancer. This study showed the importance of taking into account smoking and occupational co-exposures in studies on lung cancer and wood dust

The present study aimed to investigate the relationship between lung cancer risk and wood dust exposure after adjusting for occupational exposures.

exposure. Further studies evaluating the level and frequency of exposure during various tasks in woodwork are required.

Authors: Matrat M, Radoi L, Févotte J, Guida F, Cénée S, Cyr D, Sanchez M, Menvielle G, Schmaus A, Marrer E, Luce D, Stücker I; ICARE Study Group.

Collaborators: Guizard AV, Danzon A, Woronoff AS, Michel V, Buemi A, Marrer É, Tretarre B, Colonna M, Delafosse P, Bercelli P, Molinie F, Bara S, Lapotre-Ledoux B, Raverdy N, Gaye O, Lamkarkach F, Pilorget C.

Full Source: Occupational & Environmental Medicine. 2019 Sep 19. pii: oemed-2019-105802. doi: 10.1136/oemed-2019-105802. [Epub ahead of print]

EASL Clinical Practice Guideline: Occupational liver diseases

2019-11-14

A variety of chemicals have been linked to occupational liver diseases, including several solvents and mixtures thereof, pesticides, and metals. Workplace exposures have been associated with virtually the entire spectrum of acute and chronic liver diseases. However, their prevalence is inadequately quantified and their epidemiology limited. Occupational liver diseases may result from high accidental or from prolonged lower level exposures. Whereas the former is uncommon and easily recognised, the latter are relatively more frequent but often overlooked because they may display normal values of conventional markers, have an insidious onset and be asymptomatic or be obfuscated and confounded by concurrent conditions. In addition, specific tests of toxicity are not available, histopathology may not be revealing and the assessment of internal dose of chemicals is usually not decisive. Given these circumstances, the diagnosis of these liver disorders is challenging, one of exclusion and often requires an interdisciplinary approach. These recommendations offer a classification of the type of liver injuries associated with occupational exposures - based in part on the criteria for drug-induced liver injury - a grading of their severity, and the diagnostic and preventive criteria for chemically induced occupational liver disease.

Authors: European Association for the Study of the Liver. Electronic address: easloffice@easloffice.eu; Clinical Practice Guideline Panel: Chair; Panel members: Collaborators: Colombo M, La Vecchia C, Lotti M, Lucena MI, Stove C, Paradis V.

Full Source: Journal of Hepatology. 2019 Sep 17. pii: S0168-8278(19)30474-X. doi: 10.1016/j.jhep.2019.08.008. [Epub ahead of print]

Occupational contact dermatitis in a manicurist

2019-11-14

The authors report a case of a manicurist who developed an allergic skin reaction to acrylates, manifested by itchy erythema, papules, vesicles and fissures on her hands, fingertips, forearm and eyelids. Patch tests showed positive reactions to three nail products used: ethylene glycol dimethacrylate, 2-hydroxyethyl methacrylate, ethyl acrylate and 2-hydroxyethyl acrylate in (meth)acrylate series. By using gel nail products, our patient became sensitised to 2-hydroxyethyl methacrylate. It was assumed that this had been the trigger, leading to the occurrence of cross-reactions between numerous acrylates including ethylene glycol dimethacrylate, ethyl acrylate and 2-hydroxyethyl acrylate. When handling nail products, it is necessary to prevent airway sensitisation, contact sensitisation and cross-reaction between various acrylates.

Authors: Nakagawa M, Hanada M, Amano H.

Full Source: Journal of Dermatology. 2019 Sep 4. doi: 10.1111/1346-8138.15062. [Epub ahead of print]

Assessment of the chemical hazard awareness of petrol tanker driver: A case Study

2019-11-14

Understanding the tanker driver hazard awareness on chemical exposure is important to ensure that they are fortified with the appropriate information regarding the risk of their occupation. This present study was conducted to determine the awareness of the petrol tanker driver on the chemical exposure during transportation petroleum product. The assessment on hazardous awareness of the petrol tank driver was conducted through questionnaire survey. Wherein, the questionnaire was designed with considering the variables of age of the driver, working experience, working hours in a day and knowledge on chemical hazard presence in the petroleum oil. A reliability test of Cronbach's Alpha was performed to validate the questionnaire and the Chi-Square test was conducted to determine the correlation among the studied variables. The findings of the present study revealed that the drivers who are frequently come into direct contact with petrol cannot identify the spillage had occurred during working. The study identified that there is an urgency to

The authors report a case of a manicurist who developed an allergic skin reaction to acrylates, manifested by itchy erythema, papules, vesicles and fissures on her hands, fingertips, forearm and eyelids.

conduct training on safe handling of petroleum oil in order to eliminate the risk of chemical hazards exposure to the tanker driver.

Authors: Syimir Fizal AN, Sohrab Hossain M, Alkarkhi AFM(1), Oyekanmi AA, Hashim SRM, Khalil NA, Zulkifli M, Ahmad Yahaya AN.

Full Source: Heliyon. 2019 Aug 26;5(8):e02368. doi: 10.1016/j.heliyon.2019.e02368. eCollection 2019 Aug.

The impact of alternative historical extrapolations of diesel exhaust exposure and radon in the diesel exhaust in miners' study (DEMS)

2019-11-14

Previous results from the Diesel Exhaust in Miners Study (DEMS) demonstrated a positive exposure-response relation between lung cancer and respirable elemental carbon (REC), a key surrogate for diesel exhaust exposure. Two issues have been raised regarding DEMS: (i) the use of historical carbon monoxide (CO) measurements to calibrate models used for estimating historical exposures to REC in the DEMS exposure assessment; and (ii) potential confounding by radon. The authors developed alternative REC estimates using models that did not rely on CO for calibration, but instead relied on estimated use of diesel equipment, mine ventilation rates and changes in diesel engine emission rates over time. These new REC estimates were used to quantify cumulative REC exposure for each subject in the nested case-control study. The authors conducted conditional logistic regression to estimate odds ratios (ORs) and 95% confidence intervals for lung cancer. To evaluate the impact of including radon as a potential confounder, ORs for average REC intensity were estimated and adjusted for cumulative radon exposure in underground miners. Validation of the new REC exposure estimates indicated that they overestimated historical REC by 200-400%, compared with only 10% for the original estimates. Effect estimates for lung cancer using these alternative REC exposures or adjusting for radon typically changed by <10% when compared with the original estimates. The authors concluded that these results emphasise the robustness of the DEMS findings, support the use of CO for model calibration and confirm that radon did not confound the DEMS estimates of the effect of diesel exposure on lung cancer mortality.

Full Source: Vermeulen R, Portengen L, Lubin J, Stewart P, Blair A, Attfield MD, Silverman DT.

Full Source: International Journal of Epidemiology. 2019 Sep 20. pii: dyz189. doi: 10.1093/ije/dyz189. [Epub ahead of print]

The authors developed alternative REC estimates using models that did not rely on CO for calibration, but instead relied on estimated use of diesel equipment, mine ventilation rates and changes in diesel engine emission rates over time.

PUBLIC HEALTH RESEARCH

Determination and analysis of harmful components in synthetic running tracks from Chinese primary and middle schools

2019-11-14

In China, incidences involving pupils suffering health problems caused by synthetic running tracks have attracted the public's attention. However, the existence of known and unknown harmful chemicals in the tracks have not yet been explored. In this study, the levels of 16 known harmful ingredients were firstly analysed in 167 school running tracks. In all samples, the recognised toxic solvents and additives, such as the benzene series, soluble mercury, 3,3'-dichloro-4,4'-diaminodiphenylmethane (MOCA) and toluene diisocyanate monomer (TDI) were under the limits of detection. In contrast, polycyclic aromatic hydrocarbons (PAHs), phthalates, Short chain chlorinated paraffins (SCCPs) soluble lead, cadmium and chromium were found in 86%, 88%, 46%, 81%, 43% and 83% of the specimens, respectively. The levels, toxicology and distribution of these known chemicals were evaluated. Then, a static-headspace gas chromatography-mass spectrometer (GC-MS) method in full scan mode was employed to screen for unknown volatile chemicals. Three groups of chemicals reflecting different kinds of pollution sources were discovered: new solvents, such as N, N-Dimethylformamide, new additives, such as 2-ethylhexanoic acid, and by-products, such as carbon disulfide. In summary, the existence of potential risk factors in school plastic tracks was revealed through exhaustive testing. Moreover, most of the hazardous components detected have been recently included in a new national standard to improve the safety performance of synthetic running tracks. In this study, the levels of 16 known harmful ingredients were firstly analysed in 167 school running tracks.

Authors: Wu X, Li N, Ji H, Zhang H, Bu J, Zhang X, Qian S, Yang Y, Han B, Wang H, Ye P, Zhou J, Zhang C.

Full Source: Science Reports. 2019 Sep 4;9(1):12743. doi: 10.1038/s41598-019-49142-9.

In this study, the levels of 16 known harmful ingredients were firstly analysed in 167 school running tracks.

Health risks and source identification of dietary exposure to indicator polychlorinated biphenyls (PCBs) in Lanzhou, China

2019-11-14

Polychlorinated biphenyls (PCBs) are widely present in multiple environmental media even long after the phaseout, posing a health risk to the general population. Dietary intake is the major exposure route of PCBs; however, information is limited regarding PCBs in food that people directly consume. This study aims to measure personal exposure to indicator PCBs, evaluate the health risks, and identify their sources in a typical metropolitan city in China. Multi-day food samples were collected from 21 subjects in Lanzhou, Gansu Province, in two seasons using the duplicate plate method. Samples were extracted and analysed for seven indicator PCBs using gas chromatography/mass spectrometry. Average daily doses (ADDs) of $\Sigma 7$ PCBs were estimated using Monte Carlo analysis with food intake information. Results show that PCB-118 and PCB-180 were the major congeners in food samples with average concentrations of 1.42 and 1.11 ng/g, respectively. The average (\pm SD) ADD of $\Sigma 7$ PCBs was 26.47 ± 22.10 ng/kg day among adults aged 18-69 years and displayed small variation across age groups. Comparing with the chronic RfD of 7 ng/kg day, 67% of people had their ADDs exceeding this threshold. The median cancer risk was 5.52×10^{-5} , and 51% of residents had risks exceeding the action level of 10^{-4} . The principal component analysis identified waste incineration, gasoline engine production, and leakage of #1 PCBs as the major PCBs sources. In conclusion, a large portion of Lanzhou residents has high non-cancer and cancer risks from dietary exposure to PCBs, which warrants control actions targeting these major sources.

Authors: Kang Y, Cao S, Yan F, Qin N, Wang B, Zhang Y, Shao K, El-Maleh CA, Duan X.

Full Source: Environmental & Geochemical Health. 2019 Sep 19. doi: 10.1007/s10653-019-00402-7. [Epub ahead of print]

Exposure to humidifier disinfectants induces developmental effects and disrupts thyroid endocrine systems in zebrafish larvae.

2019-11-14

Humidifier disinfectants have been widely used in Korea to prevent the growth of microorganisms in humidifier water. However, their use has been banned since 2011 after epidemiological studies reported humidifier

In the present study, the developmental effects of exposure to two humidifier disinfectants and their main component, polyhexamethylene guanidine (PHMG)-phosphate, were investigated in zebrafish embryos/larvae for seven days.

disinfectant induced lung injury. In the present study, the developmental effects of exposure to two humidifier disinfectants (Oxy[®] and Wiselect) and their main component, polyhexamethylene guanidine (PHMG)-phosphate, were investigated in zebrafish embryos/larvae for seven days. The effects on triiodothyronine (T3) and thyroxine (T4) hormones, reactive oxygen species (ROS) generation, antioxidant enzyme activities, and changes in expression of the genes related to the hypothalamus-pituitary-thyroid (HPT) axis and oxidative stress were also investigated. Zebrafish embryos exposed to the highest concentration (amounts recommended for use by the manufacturers) of all tested humidifier disinfectants showed an increase in embryo coagulation, leading to death without hatching. Exposure to Oxy[®] and Wiselect resulted in significantly decreased body length, increased ROS generation and antioxidant enzyme activities, decreased T4, and up-regulated genes related to the HPT axis (*trh*, *trβ*, and *tpo*) and oxidative damage (*sod2* and *gpx1b*). The humidifier disinfectants and PHMG-phosphate could induce oxidative stress and disrupt thyroid hormone systems in zebrafish, leading to developmental retardation when used at sub-lethal concentrations. Potential effects of long-term exposure to humidifier disinfectants and mixture effects of several major components deserve further investigation.

Authors: Kim H, Ji K.

Full Source: *Ecotoxicology & Environmental Safety*. 2019 Nov 30; 184:109663. doi: 10.1016/j.ecoenv.2019.109663. Epub 2019 Sep 17.

Family-based case-control study of exposure to household humidifier disinfectants and risk of idiopathic interstitial pneumonia

2019-11-14

In Korea, several household humidifier disinfectants (HDs) were clinically confirmed to cause HD-associated lung injury (HDLI). Polyhexamethylene guanidine (PHMG) phosphate is the main ingredient of the HDs found to be associated with lung disease. However, the association of HDs with other interstitial lung disease including idiopathic interstitial pneumonia (IIP) is not clear. In the present study, the authors examined the relationship between HD exposure and IIP in a family-based study. This case-control study included 244 IIP cases and 244 family controls who lived with the IIP patients. The IIP cases were divided into two groups, HDLI and other IIP, and were matched to family controls based on age and gender. Information on exposure to HDs was obtained from a structured questionnaire and field investigations. Conditional logistic regression was used to estimate odds ratio (ORs) and their corresponding

In the present study, the authors examined the relationship between household humidifier disinfectants exposure and idiopathic interstitial pneumonia in a family-based study.

95% confidence interval (CI), investigating the association of HD-related exposure characteristics with IIP risk. The risks of IIP increased two-fold or more in the highest compared with the lowest quartile of several HD use characteristics, including average total use hours per day, cumulative sleep hours, use of HD during sleep, and cumulative exposure level. In analyses separated by HDLI and other IIP, the risks of HDLI were associated with airborne HD concentrations (adjusted OR = 3.01, 95% CI = 1.34-6.76; Q4 versus Q1) and cumulative exposure level (adjusted OR = 3.57, 95% CI = 1.59-8.01; Q4 versus Q1), but this relationship was not significant in the patients with other IIP. In comparison between HDLI and other IIP, the odds ratios of average total use hours, cumulative use hours, and cumulative sleeps hours was higher for other IIP. The use of household HDs is associated not only with HDLI but also with other IIP.

Authors: Lamichhane DK, Leem JH, Lee SM, Yang HJ, Kim J, Lee JH, Ko JK, Kim HC, Park DU, Cheong HK.

Full Source: PLoS One. 2019 Sep 5;14(9):e0221322. doi: 10.1371/journal.pone.0221322. eCollection 2019

Non-linear relationship between triglyceride/high-density lipoprotein cholesterol ratio and chronic kidney disease in US adults: a National Health and Nutrition Examination Survey investigation

2019-11-14

Published data on the association between triglycerides/high-density lipoprotein cholesterol (TG/HDL-C) ratio and chronic kidney disease (CKD) in US populations are limited. The authors examined the association between TG/HDL-C ratio and the prevalence of CKD using US National Health and Nutrition Examination Survey (NHANES) database. This cross-sectional study included 13,780 US adults from NHANES (1999-2006). CKD was defined as an estimated glomerular filtration rate (eGFR) < 60 ml/min/1.73 m² or albuminuria. Multivariable logistic regression models were used to examine the relationship between TG/HDL-C ratio and CKD. A generalised additive model (GAM) and smooth curve fitting (penalized spline method) and a two-piecewise logistic regression models were also conducted to address for nonlinearity between TG/HDL-C ratio and CKD. The prevalence of CKD was 15.8%. Multiple logistic analyses showed that showed that TG/HDL-C ratio was associated with 5% increased prevalence of CKD. Analyses using restricted cubic spline showed a saturation and nonlinear association between TG/HDL-C ratio and CKD. The inflection point for the curve was found at a TG/HDL-C ratio level of 6.68. The ORs (95% CIs) for CKD were 1.08 (1.04, 1.13) and 0.97 (0.89, 1.05) to the left and

Published data on the association between triglycerides/high-density lipoprotein cholesterol (TG/HDL-C) ratio and chronic kidney disease (CKD) in US populations are limited.

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right of the inflection point, respectively. None of all stratified variables showed significant effect modification on the association between TG/HDL-C ratio and CKD (P-interaction > 0.05). This study suggested saturated effects of TG/HDL-C ratio on the prevalence of CKD among US adults. TG/HDL-C ratio less than 6.68 was positively and independently associated with CKD.

Authors: Yu L, Zhou L, Zhou D, Hu G.

Full Source: International Urology and Nephrology. 2019 Sep 19. doi: 10.1007/s11255-019-02287-y. [Epub ahead of print]