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CHEMICAL EFFECTS

Distribution patterns of rubber tire-related chemicals with particle size in road and indoor parking lot dust

2022-07-05

In recent years, concerns have arisen from the chemicals incorporated into tire material which are of potential to leach with the tire and road wear particles (TRWP) into the environment. In this study, the distributions of substituted benzothiazoles (BTHs) and p-phenylenediamines (PPDs), two groups of representative TRWP-related chemicals, were investigated in various size fractions (<20, 20-53, 53-125, 125-250, 250-500, 500-1000 μm) of dust samples from open roads and indoor parking lots in the urban region of Guangzhou (Guangdong, China). Mass weight distribution of the dust samples showed that fractions of <250 μm accounted for >72% of the total dust in both microenvironments. Widespread occurrence was observed with >80% detection frequency for almost all target compounds in all the particle fractions. Concentrations of BTHs and PPDs were similar between the two dust matrices. In addition, the newly defined transformation product of 6PPD, 6PPD-Q was at the median concentration of 122 ng/g in road dust and 154 ng/g in indoor parking lot dust. Overall, concentrations of the target BTHs and PPDs varied in different size fractions, which were mostly dominated in fine particle sizes (<53 μm). Specially, >70% of the target compounds were in the size fractions of <250 μm , suggesting the necessity of using <250 μm fractions of particles for monitoring and evaluating contamination levels and exposure risks of BTHs and PPDs from dust in future studies.

Authors: Chengliang Deng, Jialing Huang, Yunqing Qi, Da Chen, Wei Huang

Full Source: The Science of the total environment 2022 Jul 5;844:157144. doi: 10.1016/j.scitotenv.2022.157144.

Microalgae-based removal of pollutants from wastewaters: Occurrence, toxicity and circular economy

2022-07-05

The natural and anthropogenic sources of water bodies are contaminated with diverse categories of pollutants such as antibiotics, pharmaceuticals, pesticides, heavy metals, organic compounds, and other industrial chemicals. Depending on the type and the origin of the pollutants, the degree of contamination can be categorized into lower to higher concentrations. Therefore, the removal of hazardous chemicals from

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the environment is an important aspect. The physical, chemical and biological approaches have been developed and implemented to treat wastewaters. The microbial and algal treatment methods have emerged as a growing field due to their eco-friendly and sustainable approach. Particularly, microalgae emerged as a potential organism for the treatment of contaminated water bodies. The microalgae of the genera Chlorella, Anabaena, Ankistrodesmus, Aphanizomenon, Arthrospira, Botryococcus, Chlamydomonas, Chlorogloeopsis, Dunaliella, Haematococcus, Isochrysis, Nannochloropsis, Porphyridium, Synechococcus, Scenedesmus, and Spirulina reported for the wastewater treatment and biomass production. Microalgae have the potential for adsorption, bioaccumulation, and biodegradation. The microalgal strains can mitigate the hazardous chemicals via their diverse cellular mechanisms. Applications of the microalgae strains were found to be effective for sustainable developments and circular economy due to the production of biomass with the utilization of pollutants.

Authors: Pankaj Bhatt, Geeta Bhandari, Kalpana Bhatt, Halis Simsek

Full Source: Chemosphere 2022 Jul 5;135576. doi: 10.1016/j.chemosphere.2022.135576.

Skin Toxicity of Selected Hair Cosmetic Ingredients: A Review Focusing on Hairdressers

2022-06-21

The safety assessment of cosmetics considers the exposure of a 'common consumer', not the occupational exposure of hairdressers. This review aims to compile and appraise evidence regarding the skin toxicity of cysteamine hydrochloride (cysteamine HCl; CAS no. 156-57-0), polyvinylpyrrolidone (PVP; CAS no. 9003-39-8), PVP copolymers (CAS no. 28211-18-9), sodium laureth sulfate (SLES; CAS no. 9004-82-4), cocamide diethanolamine (cocamide DEA; CAS no. 68603-42-9), and cocamidopropyl betaine (CAPB; CAS no. 61789-40-0). A total of 298 articles were identified, of which 70 were included. Meta-analysis revealed that hairdressers have a 1.7-fold increased risk of developing a contact allergy to CAPB compared to controls who are not hairdressers. Hairdressers might have a higher risk of acquiring quantum sensitization against cysteamine HCl compared to a consumer because of their job responsibilities. Regarding cocamide DEA, the irritant potential of this surfactant should not be overlooked. Original articles for PVP, PVP copolymers, and SLES are lacking. This systematic review indicates that the current standards do not effectively address the occupational risks associated with hairdressers' usage of hair cosmetics. The considerable irritant and/or allergenic potential of substances used in

The safety assessment of cosmetics considers the exposure of a 'common consumer', not the occupational exposure of hairdressers.

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hair cosmetics should prompt a reassessment of current risk assessment practices.

Authors: Cara Symanzik, Patricia Weinert, Željka Babić, Sarah Hallmann, Martin Stibius Havmose, Jeanne Duus Johansen, Sanja Kezic, Marija Macan, Jelena Macan, Julia Strahwald, Rajka Turk, Henk F van der Molen, Swen Malte John, Wolfgang Uter

Full Source: International journal of environmental research and public health 2022 Jun 21;19(13):7588. doi: 10.3390/ijerph19137588.

ENVIRONMENTAL RESEARCH

Occurrence of herbicides in the aquatic environment and their removal using advanced oxidation processes: a critical review

2022-07-07

Herbicides are chemicals used globally to kill unwanted plants so as to obtain high agricultural yields and good agricultural products. Herbicides are sometimes transported from the farmlands into water bodies mainly through runoffs. These chemicals are recalcitrant, and their accumulation is hazardous to abiotic and biotic components of the ecosystem. At present, the best alternative technology for elimination of herbicides in water is the usage of advanced oxidation processes (AOPs). The AOPs, which are performed homogeneously or heterogeneously, are capable of breaking down complex pollutants in water into carbon dioxide and mineral compounds. In these processes, $\cdot\text{OH}$ is produced and used for degradation process. It is recommended that the total organic carbon (TOC) produced during degradation reaction be monitored because the $\cdot\text{OH}$ produced or generated can react to form intermediates before complete mineralisation is achieved. Different kinds of AOPs for degradation of herbicides have their specific advantages as well as limitations. This report shows that AOPs are excellent techniques for degradation of herbicides in aqueous solutions, and the mechanisms showed that herbicides were mineralised. The amount and type of photocatalysts, pH of the medium, surface characteristics of the photocatalysts, doping of the photocatalysts, temperature of the medium, concentration of herbicides, presence of competing ions, intensity and irradiation period, and type of oxidants have great influence on the degradation of herbicides in water. Overall, this report showed that most AOPs could not completely degrade herbicides in water and complete degradation can be achieved by developing novel

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and robust AOPs that will completely mineralise herbicides in water-this will pave way for water and environmental safety.

Authors: Ifeoluwa O Daramola, Mike O Ojemaye, Anthony I Okoh, Omobola O Okoh

Full Source: Environmental geochemistry and health 2022 Jul 7. doi: 10.1007/s10653-022-01326-5.

Legionella and Air Transport: A Study of Environmental Contamination

2022-06-30

Introduction: There is growing interest in the public health and transport sectors in research into exposure to biological hazards, considering not only the risks arising from inter-human contagion, but also those related to exposure to the flight environment itself. The aim of this paper is to report data from an investigation into the water and air-conditioning systems of commercial aircraft for the presence of Legionella contamination, with a total of 645 water samples taken during the period 2007-2021. **Methods:** The investigation involved 126 aircraft of six different commercial aircraft types: MD80, Airbus A320 F, Embraer 175/190, AIRBUS A330, Boeing 767 and Boeing 777. Water samples were taken from the water systems (toilet taps, galley and boilers). Each sample was preliminarily subjected to an evaluation of the following parameters: temperature, pH and residual chlorine. The ScanVit® Legionella kit was used for bacteria detection and enumeration. **Results:** Samples were considered positive if the number of colony-forming units/liter (CFU/L) was ≥ 100 . For the entire observation period, 45% of the investigated aircraft tested positive. Regarding the overall number of samples analyzed, 68.4% (441/645) were below 100 CFU/L, and thus within the limits allowed by the Italian Guidelines. **Conclusions:** Water system contamination with Legionella in the air transport field is a real public health issue that should not be underestimated given the heavy passenger traffic. Infection should be considered an occupational risk to which crew members are exposed.

Authors: Michele Treglia, Margherita Pallocci, Giorgio Ricciardi Tenore, Paola Castellani, Fabrizio Pizzuti, Giovanna Bianco, Pierluigi Passalacqua, Lucilla De Luca, Claudia Zanollo, Daniela Mazzuca, Santo Gratteri, Agostino Messineo, Giuseppe Quintavalle, Luigi Tonino Marsella

Full Source: International journal of environmental research and public health 2022 Jun 30;19(13):8069. doi: 10.3390/ijerph19138069.

Introduction: There is growing interest in the public health and transport sectors in research into exposure to biological hazards, considering not only the risks arising from inter-human contagion, but also those related to exposure to the flight environment itself.

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Impact of industrial effluents on the environment and human health and their remediation using MOFs-based hybrid membrane filtration techniques

2022-07-06

The hazardous risk posed by industrial effluent discharge into the ecosystem has raised a plethora of environmental issues, public health, and safety concerns. The effluents from industries such as tanning, leather, petrochemicals, pharmaceuticals, and textiles put significant stress on the aquatic ecosystem, which induces significant toxicity, participates in endocrine disruptions, and inhibits reproductive functions. Therefore, this review paper presented an overall abridgment of the effects of these effluents and their ability to synergize with modern pollutants such as pharmaceuticals, cosmetic chemicals, nanoparticles, and heavy metals. We further emphasize the metal organic framework (MOF) based membrane filtration approach for remediation of industrial effluents in comparison to the traditional remediation process. The MOF based-hybrid membrane filters provide higher reusability, better adsorption, a larger surface area, and superior removal rates through the implication of nanotechnology, while the traditional remediation process offers poorer filtration rates and stability. For example, MIL-100 (Fe)-UF and MIL-101(Cr)-UF exhibited high removal rates (94.7%) of natural organic matter NOM. It also elucidated the backstage processes involved in the remediation mechanism of MOFs based-hybrid membrane filtration of the discussed effluents.

Authors: Kandasamy Saravanakumar, Shanali De Silva, Sugavaneswaran Siva Santosh, Anbazhagan Sathiyaseelan, Archchana Ganeshalingam, Monica Jamla, Alwarappan Sankaranarayanan, Veeraraghavan Vishnu Priya, Davoodbasha MubarakAli, Joeun Lee, Gobika Thiripuranathar, Myeong-Hyeon Wang

Full Source: Chemosphere 2022 Jul 6;135593. doi: 10.1016/j.chemosphere.2022.135593.

PHARMACEUTICAL/TOXICOLOGY

Occupational exposure to pesticides in mothers and fathers and risk of cancer in the offspring: A register-based case-control study from Sweden (1960-2015)

2022-07-06

Maternal and paternal occupational exposure to pesticides was linked to leukemia in the offspring in some previous studies. Risks for other cancers, particularly from maternal exposure, are largely unknown. We examined

The hazardous risk posed by industrial effluent discharge into the ecosystem has raised a plethora of environmental issues, public health, and safety concerns.

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the association between maternal and paternal exposure to pesticides and childhood cancer in a Swedish register-based case-control study (1960-2015). Cancer cases <20 years old were identified from the Cancer Register (n = 17313) and matched to controls (1:25) on birth year and sex. Employment history of each biological parent around the child's birth was retrieved from six censuses and a nationwide register, and exposure to any of herbicides, insecticides, and fungicides was evaluated using the Swedish job-exposure matrix (SWEJEM) in 9653/172194 mothers and 12521/274434 fathers of cases/controls. Adjusted odds ratios (OR) and 95% confidence intervals (CI) were estimated from conditional logistic regression models for any cancer, leukemia, lymphoma, central nervous system [CNS], and other solid tumors. We found an OR of 1.42 (95% CI 0.78, 2.57; 12 exposed cases) for lymphoma and 1.30 (95% CI 0.88, 1.93; 27 exposed cases) for other solid tumors associated with maternal occupational exposure to pesticides. No associations were observed between maternal exposure and leukemia or CNS tumors, or paternal exposure and any of the cancers examined, except for a potential association between pesticides exposure and myeloid leukemia (OR 1.15 [95% CI 0.73, 1.79; 22 exposed cases]). Although these findings merit further investigation, they indicate that parental exposure to pesticides may lead to higher risks of childhood cancer even in settings of low exposure.

Authors: Marios Rossides, Christina-Evmorfia Kampitsi, Mats Talbäck, Hanna Mogensen, Pernilla Wiebert, Giorgio Tettamanti, Maria Feychting
Full Source: Environmental research 2022 Jul 6;113820. doi: 10.1016/j.envres.2022.113820.

Toxicological and Teratogenic Effect of Various Food Additives: An Updated Review

2022-06-24

Scientific evidence is mounting that synthetic chemicals used as food additives may have harmful impacts on health. Food additives are chemicals that are added to food to keep it from spoiling, as well as to improve its colour and taste. Some are linked to negative health impacts, while others are healthy and can be ingested with little danger. According to several studies, health issues such as asthma, attention deficit hyperactivity disorder (ADHD), heart difficulties, cancer, obesity, and others are caused by harmful additives and preservatives. Some food additives may interfere with hormones and influences growth and development. It is one of the reasons why so many children are overweight. Children are more likely than adults to be exposed to these

Scientific evidence is mounting that synthetic chemicals used as food additives may have harmful impacts on health.

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types of dietary intakes. Several food additives are used by women during pregnancy and breast feeding that are not fully safe. We must take specific precaution to avoid consuming dangerous compounds before they begin to wreak havoc on our health. This study is intended to understand how the preservatives induce different health problem in the body once it is consumed. This review focuses on some specific food additives such as sodium benzoate, aspartame, tartrazine, carrageenan, and potassium benzoate, as well as vitamin A. Long-term use of food treated with the above-mentioned food preservatives resulted in teratogenicity and other allergens, according to the study. Other health issues can be avoided in the future by using natural food additives derived from plants and other natural sources.

Authors: Saseendran Sambu, Urmila Hemaram, Rajadurai Murugan, Ahmed A Alsofi

Full Source: BioMed research international 2022 Jun 24;2022:6829409. doi: 10.1155/2022/6829409.

OCCUPATIONAL

Serum metabolic profiling of coal worker's pneumoconiosis using untargeted lipidomics

2022-07-07

In this work, untargeted lipidomics was employed to analyze the effects of coal dust exposure on serum metabolite profiles. Furthermore, the potential of differential metabolites as novel biomarkers for diagnosis was investigated by binary logistic classification model. Nineteen differential metabolites were found among the three groups. The compounds were enriched in pathways associated with linoleic acid metabolism and pyrimidine metabolism. Fifty-three differential metabolites were found in coal dust-exposed people and CWP patients, and they were mainly enriched in glycerophospholipid metabolism. Three differential metabolites were correlated with lung function values. The diagnostic model, composed of lysoPI (16:0/0:0), bilirubin, and lysoPC (24:1/0:0), showed strong discrimination ability between dust-exposed people and CWP patients. The sensitivity, specificity, and AUC values of the model were 0.869, 0.600, and 0.750, respectively. The results suggest that coal worker's pneumoconiosis causes abnormal lipid metabolism in the body. A diagnostic model may aid current CWP diagnostic methods, and lysoPI (16:0/0:0), bilirubin, and lysoPC (24:1/0:0) can be used as potential CWP

In this work, untargeted lipidomics was employed to analyze the effects of coal dust exposure on serum metabolite profiles.

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biomarkers. Further study is warranted to validate the findings in larger populations.

Authors: Fangda Peng, Jing Dai, Qingjun Qian, Xiangfu Cao, Lifang Wang, Min Zhu, Shujin Han, Wubin Liu, Yan Li, Teng Xue, Xianyang Chen, Xiaoli Yang, Jiaolei Wang, Huanqiang Wang, Tao Li, Chunguang Ding
Full Source: Environmental science and pollution research international 2022 Jul 7. doi: 10.1007/s11356-022-21905-4.

Evolution and Applications of Recent Sensing Technology for Occupational Risk Assessment: A Rapid Review of the Literature

2022-06-27

Over the last decade, technological advancements have been made available and applied in a wide range of applications in several work fields, ranging from personal to industrial enforcements. One of the emerging issues concerns occupational safety and health in the Fourth Industrial Revolution and, in more detail, it deals with how industrial hygienists could improve the risk-assessment process. A possible way to achieve these aims is the adoption of new exposure-monitoring tools. In this study, a systematic review of the up-to-date scientific literature has been performed to identify and discuss the most-used sensors that could be useful for occupational risk assessment, with the intent of highlighting their pros and cons. A total of 40 papers have been included in this manuscript. The results show that sensors able to investigate airborne pollutants (i.e., gaseous pollutants and particulate matter), environmental conditions, physical agents, and workers' postures could be usefully adopted in the risk-assessment process, since they could report significant data without significantly interfering with the job activities of the investigated subjects. To date, there are only few "next-generation" monitors and sensors (NGMSs) that could be effectively used on the workplace to preserve human health. Due to this fact, the development and the validation of new NGMSs will be crucial in the upcoming years, to adopt these technologies in occupational-risk assessment.

Authors: Giacomo Fanti, Andrea Spinazzè, Francesca Borghi, Sabrina Rovelli, Davide Campagnolo, Marta Keller, Andrea Borghi, Andrea Cattaneo, Emanuele Cauda, Domenico Maria Cavallo

Full Source: Sensors (Basel, Switzerland) 2022 Jun 27;22(13):4841. doi: 10.3390/s22134841.

Over the last decade, technological advancements have been made available and applied in a wide range of applications in several work fields, ranging from personal to industrial enforcements.