

Bulletin Board

Contents

MAY. 08, 2020

(click on page numbers for links)

CHEMICAL EFFECTS

ERK is involved in the differentiation and function of dimethyl sulfoxide-induced HL-60 neutrophil-like cells, which mimic inflammatory neutrophils	3
Quantitative structure activity relationship (QSAR) modelling of the degradability rate constant of volatile organic compounds (VOCs) by OH radicals in atmosphere.....	4
Indoor air partitioning of Synthetic Musk Compounds: Gas, particulate matter, house dust, and window film	4
RIFM fragrance ingredient safety assessment, 4H-1,3-benzodioxin, hexahydro-4-methyl-2-(phenylmethyl)-, CAS Registry Number 1373821-23-8.....	5
Removing critical gaps in chemical test methods by developing new assays for the identification of Thyroid Hormone System-Disrupting Chemicals—The ATHENA Project.....	6

ENVIRONMENTAL RESEARCH

Operational and structural A-stage improvements for high-rate carbon removal	7
Combined toxicity of imidacloprid and cadmium on histopathology and acetylcholinesterase activity in aquatic oligochaetes (<i>Tubifex tubifex</i> Müller, 1774)	8
Assessment of acetochlor use areas in the sahel region of Western Africa using geospatial methods.....	8
Sustainable and ecofriendly approach of managing soil born bacterium <i>Ralstonia solanacearum</i> (Smith) using dried powder of <i>Conyza canadensis</i>	9
Cigarette waste: Assessment of hazard to the environment and health in Riyadh city.....	10

PHARMACEUTICAL/TOXICOLOGY

A review of the drug-drug interactions of the antiepileptic drug brivaracetam	11
The association between urinary levels of 1,3-butadiene metabolites, cardiovascular risk factors, microparticles, and oxidative stress products in adolescents and young adults.....	12

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

Contents

MAY. 08, 2020

Predictors with regard to ingestion, inhalation and dermal absorption of estimated phthalate daily intakes in pregnant women: The Barwon infant study	13
The selected epigenetic effects of aminomethylphosphonic acid, a primary metabolite of glyphosate on human peripheral blood mononuclear cells (in vitro)	14
Epidemiology of bacteria and viruses in the respiratory tract of humans and domestic pigs	14

OCCUPATIONAL

Occupational skin conditions on the frontline: A survey among 484 Chinese healthcare professionals caring for Covid-19 patients	15
Bone mineral density in population long-term exposed to rare earth elements from a mining area of China	16
Effects of ambient PM 2.5 and particle-bound metals on the healthy residents living near an electric arc furnace: A community-based study	16
Assessment of genetic effects and pesticide exposure of farmers in NW Greece	17
Elevated occupational exposure to chlorinated phosphate esters at a construction materials manufacturing plant.....	18

Bulletin Board

Technical

MAY. 08, 2020

CHEMICAL EFFECTS

ERK is involved in the differentiation and function of dimethyl sulfoxide-induced HL-60 neutrophil-like cells, which mimic inflammatory neutrophils

2020-04-29

Reports show that particulate matter (PM) is related to respiratory and cardiovascular diseases. We previously reported the biological effects of PM in vivo and the endocytosis of PM by primary neutrophils from mice. Cell lines can be used to elucidate the mechanism underlying immune responses in detail; however, information is limited regarding the functions of neutrophils after PM exposure. Here, we investigated the immune response of primary neutrophils and dimethyl sulfoxide (DMSO)- and all-trans retinoic acid (ATRA)-differentiated HL-60 (neutrophil-like) cells to PM. We showed that endocytosis by ATRA-HL cells was enhanced compared to that by DMSO-HL cells and that endocytosis in both cells was inhibited by dynamin inhibitors. A MEK inhibitor, but not p38 or JNK inhibitors, inhibited endocytosis. The MEK inhibitor also inhibited the differentiation of ATRA-HL cells to neutrophils. We identified that endocytosis of PM by neutrophils activated the MAPK ERK and p38 pathways. DMSO-HL and ATRA-HL cells both produced TNF- α and IL-8 after lipopolysaccharide (LPS) or PM treatment, whereas non-differentiated HL-60 cells did not. MCP-1 production was enhanced in DMSO-HL cells after LPS or PM treatment, whereas it was high in ATRA-HL cells. Reactive oxygen species (ROS) production was enhanced after PM treatment to DMSO-HL cells. Further, extracellular extracts promoted endocytosis. The MEK inhibitor also reduced the production of TNF- α , IL-8, and MCP-1. Taken together, ERK activation is key for both differentiation and endocytosis, and DMSO-HL cells at day 6 can serve as a model of inflammatory neutrophils, such as bronchus neutrophils, and a good tool to analyze the molecular events involved in immune responses to PM.

Authors: Wang D, Sennari Y, Shen M, Morita K, Kanazawa T, Yoshida Y
Full Source: International Immunopharmacology. 2020 Apr 29;84:106510.
doi: 10.1016/j.intimp.2020.106510. [Epub ahead of print]

The MEK inhibitor also inhibited the differentiation of ATRA-HL cells to neutrophils.

Bulletin Board

Technical

MAY. 08, 2020

Quantitative structure activity relationship (QSAR) modelling of the degradability rate constant of volatile organic compounds (VOCs) by OH radicals in atmosphere

2020-04-23

The reaction with hydroxyl radicals ($\cdot\text{OH}$) is an important way to remove the most volatile organic compounds (VOCs) in atmospheric environment. Thus, the reaction rate constant (k_{OH}) is important for assessing the persistence and exposure risk of VOCs, and is of great significance in evaluating the ecological risk of volatile organic chemicals. Fukui indices and bond order have a large effect on the degradation of VOCs, but so far, quantitative structure activity relationship (QSAR) models for VOCs degradation have rarely been considered these two factors. In this study, these two momentous factors will be considered along with other relevant quantitative parameters. A total of 180 substances are divided into training set (144 substances) and test set (36 substances), which are used to build and validate quantitative structure activity relationship (QSAR) models, respectively. Internal, external verification and y-randomization tests showed that the established model had excellent stability and reliability. The energy of the highest occupied molecular orbital (E_{HOMO}), the possibility of being attacked by radicals ($f(O)_n$) and the breaking of chemical bonds (BO_x) are the main factors affecting VOCs removal. Finally, the scope of the application domain was determined and the robustness of the model was further verified.

Authors: Liu Y, Cheng Z, Liu S, Tam Y, Yuan T, Yu X, Shen Z

Full Source: The science of the total environment. 2020 Apr 23;729:138871.

doi: 10.1016/j.scitotenv.2020.138871. [Epub ahead of print]

Indoor air partitioning of Synthetic Musk Compounds: Gas, particulate matter, house dust, and window film

2020-04-21

Due to diversity of contaminants indoors and complexity in the physical structure of particulate matter, partition process of chemicals affects indoor concentration distribution. Synthetic Musk Compounds (SMCs) are ubiquitously found in household and personal care products, thus, in the environment. Exposure to SMCs is important for human health, therefore, their partitioning in indoor environmental media is a key issue. In this study, gas - particle, house dust, and window film partitioning of SMCs were investigated in an indoor micro-environment. In a sealed and unoccupied room, a polycyclic and nitro musk mixture was left for volatilization for an hour. Then, samples were collected using XAD-2

Synthetic Musk Compounds (SMCs) are ubiquitously found in household and personal care products, thus, in the environment.

Bulletin Board

Technical

MAY. 08, 2020

sandwiched between two PUF plugs, glass-fiber filter, and wipes for gas, PM_{10} , window-film, house dust phases, respectively, for 145 h. Collected samples were analyzed using a GC-MS. Results demonstrated that SMC concentrations decreased over time, non-linearly. Six of the SMCs partitioned to PM_{10} with at least 10% at beginning of the experiment, whereas the number of compounds dropped to two at the end, showing that SMCs may partition well between the two phases but they tend to be in the gas phase. They were also detected in the film and dust phases but a decrease pattern similar to gas-particle was not observed. Spearman correlations indicate that the dust and film-associated concentrations were governed by similar processes but PM-associated concentrations were not. SMCs may be found in all phases, mainly in house dust in terms of mass among the studied media and unaccounted surface reservoirs. Therefore, their partitioning between indoor media has key implications for human exposure.

Authors: Balci E, Genisoglu M, Sofuoglu SC, Sofuoglu A

Full Source: The science of the total environment. Apr 21;729:138798. doi: 10.1016/j.scitotenv.2020.138798. [Epub ahead of print]

RIFM fragrance ingredient safety assessment, 4H-1,3-benzodioxin, hexahydro-4-methyl-2-(phenylmethyl)-, CAS Registry Number 1373821-23-8

2020-04-28

The existing information supports the use of this material as described in this safety assessment. 4H-1,3-Benzodioxin, hexahydro-4-methyl-2-(phenylmethyl)- was evaluated for genotoxicity, repeated dose toxicity, reproductive toxicity, local respiratory toxicity, phototoxicity/photoallergenicity, skin sensitization, and environmental safety. Data from read-across analog 4-methyl-2-(1-phenylethyl)-1,3-dioxolane (CAS # 67634-23-5) show that 4H-1,3-benzodioxin, hexahydro-4-methyl-2-(phenylmethyl)- is not expected to be genotoxic. The repeated dose, reproductive, and local respiratory toxicity endpoints were evaluated using the threshold of toxicological concern (TTC) for a Cramer Class III material, and the exposure to 4H-1,3-benzodioxin, hexahydro-4-methyl-2-(phenylmethyl)- is below the TTC (0.0015 mg/kg/day, 0.0015 mg/kg/day, and 0.47 mg/day, respectively). Data from read-across analog phenylacetaldehyde 2,4-dihydroxy-2-methylpentane acetal (CAS # 67633-94-7) show that there are no safety concerns for 4H-1,3-benzodioxin, hexahydro-4-methyl-2-(phenylmethyl)- for skin sensitization under the current declared levels of use. The phototoxicity/photoallergenicity endpoints were evaluated based on ultraviolet (UV) spectra; 4H-1,3-

Data from read-across analog 4-methyl-2-(1-phenylethyl)-1,3-dioxolane (CAS # 67634-23-5) show that 4H-1,3-benzodioxin, hexahydro-4-methyl-2-(phenylmethyl)- is not expected to be genotoxic.

Bulletin Board

Technical

MAY. 08, 2020

benzodioxin, hexahydro-4-methyl-2- (phenylmethyl)-is not expected to be phototoxic/photoallergenic. The environmental endpoints were evaluated; 4H-1,3-benzodioxin, hexahydro-4- methyl-2-(phenylmethyl)- was found not to be persistent, bioaccumulative, and toxic (PBT) as per the International Fragrance Association (IFRA) Environmental Standards, and its risk quotients, based on its current volume of use in Europe and North America (i.e., Predicted Environmental Concentration/Predicted No Effect Concentration [PEC/PNEC]), are <1.

Authors: Api AM, Belmonte F, Belsito D, Biserta S, Botelho D, Bruze M, Burton GA Jr, Buschmann J, Cancellieri MA, Dagli ML, Date M, Dekant W, Deodhar C, Fryer AD, Gadhia S, Jones L, Joshi K, Lapczynski A, Lavelle M, Liebler DC, Na M, O'Brien D, Patel A, Penning TM, Ritacco G, Rodriguez-Ropero F, Romine J, Sadekar N, Salvito D, Schultz TW, Saddiqi F, Sipes IG, Sullivan G, Thakkar Y, Tokura Y, Tsang S

Full Source: Food and chemical toxicology: an international journal published for the British Industrial Biological Research Association. 2020 Apr 28;111379. doi: 10.1016/j.fct.2020.111379. [Epub ahead of print]

Removing critical gaps in chemical test methods by developing new assays for the identification of Thyroid Hormone System-Disrupting Chemicals—The ATHENA Project

2020-04-28

The test methods that currently exist for the identification of thyroid hormone system-disrupting chemicals are woefully inadequate. There are currently no internationally validated in vitro assays, and test methods that can capture the consequences of diminished or enhanced thyroid hormone action on the developing brain are missing entirely. These gaps put the public at risk and risk assessors in a difficult position.

Decisions about the status of chemicals as thyroid hormone system disruptors currently are based on inadequate toxicity data. The ATHENA project (Assays for the identification of Thyroid Hormone axis-disrupting chemicals: Elaborating Novel Assessment strategies) has been conceived to address these gaps. The project will develop new test methods for the disruption of thyroid hormone transport across biological barriers such as the blood-brain and blood-placenta barriers. It will also devise methods for the disruption of the downstream effects on the brain. ATHENA will deliver a testing strategy based on those elements of the thyroid hormone system that, when disrupted, could have the greatest impact on diminished or enhanced thyroid hormone action and therefore should be targeted through effective testing. To further enhance the impact of the

These gaps put the public at risk and risk assessors in a difficult position.

Bulletin Board

Technical

MAY. 08, 2020

ATHENA test method developments, the project will develop concepts for better international collaboration and development in the area of thyroid hormone system disruptor identification and regulation.

Authors: Kortenkamp A, Axelstad M, Baig AH, Bergman A, Bornehag CG, Cenujn P, Christiansen S, Demeneix B, Derakhshan A, Fini JB, Frädriich C, Hamers T, Hellwig L, Köhrle J, Korevaar TIM, Lindberg J, Martin O, Meima ME, Mergenthaler P, Nikolov N, Du Pasquier D, Peeters RP, Platzack B, Ramhøj L, Remaud S, Renko K, Scholze M, Stachelscheid H, Svingen T, Wagenaars F, Wedebye EB, Zoeller RT

Full Source: International journal of molecular sciences. 2020 Apr 28;21(9). pii: E3123. doi: 10.3390/ijms21093123

ENVIRONMENTAL RESEARCH

Operational and structural A-stage improvements for high-rate carbon removal

2020-05-01

Bio-sorption of organics is investigated at two sites in order to optimize operation and infrastructure for carbon removal and redirection in up-stream, high-rate processes. Sufficient process temperature and stable mixed liquor solids concentration were established as the key impact parameters for the process performance. Improved COD removal was achieved by either substantially enhanced aeration (elevated metabolic state) or by enhanced flocculation capability (dosed chemicals). Separation and thickening of organics are typically operated as continuous-flow processes. The optimization of performance parameters led to a new A-stage process named Alternating Activated Adsorption. The AAA-process is presented as a novel configuration linking bio-sorption and thickening capabilities in an alternating scheme without mechanical equipment. The performance data from its first trial indicate benefits from process dynamics including high organics capture rates and thickening capabilities reaching solids concentrations higher than 40 g(TSS)/L. COD removal could be increased further by adding biologically-generated polymer i.e. waste sludge from B-stage.

Authors: Wett B, Aichinger P, Hell M, Anderson M, Wellym, Fukuzaki Y, Cao Y, Tao G, Jimenez J, Takacs I, Bott C, Murthy S

Full Source: Water Environment Research: A research publication of the Water Environment Federation. 2020 May 1. doi: 10.1002/wer.1354. [Epub ahead of print]

Separation and thickening of organics are typically operated as continuous-flow processes.

Bulletin Board

Technical

MAY. 08, 2020

Combined toxicity of imidacloprid and cadmium on histopathology and acetylcholinesterase activity in aquatic oligochaetes (*Tubifex tubifex* Müller, 1774)

2020-05-02

Imidacloprid is one of the neonicotinoid insecticides that has been applied in many farmlands and was detected in many water resources worldwide. However, not only this insecticide but also cadmium was found in the agricultural wastewater in close proximity to industrial areas. This research aims to investigate the acute toxicity of imidacloprid and cadmium on the biochemical changes, pathological changes and accumulation of cadmium in *Tubifex tubifex* after 24- and 48-h exposure. The results show that combined toxicity of two chemicals was synergistic. In combined toxicity test, cadmium accumulation and acetylcholinesterase activity in worm tissue were significantly increased when compared with the single test. The severity of histopathology shows a dose-dependent relationship. Epidermal and gut cell degeneration, hyperplasia of epidermal and gut cells, irregular surface of the epidermis, overexpression of chloragosome and nerve degeneration were observed. Overall, this research provides useful bio-markers to assess the toxicity of imidacloprid and cadmium on the aquatic environment.

Authors: Lekvongphiboon P, Praphairaksit N

Full Source: Environmental geochemistry and health. 2020 May 2. doi: 10.1007/s10653-020-00585-4. [Epub ahead of print]

Assessment of acetochlor use areas in the sahel region of Western Africa using geospatial methods

2020-05-01

The goal of this study was to determine the co-occurrence between acetochlor use on crops and potentially vulnerable soils in the Permanent Interstate Committee for Drought Control in the Sahel region of Western Africa. Acetochlor, a pre-emergence herbicide, is used primarily on row crops and has the potential to reach groundwater or surface water following a rain event shortly after application. Off-field transport is often determined by soil properties; therefore, soils within potential use areas were assessed and mapped to establish areas with soils vulnerable to leaching and/or runoff. Corn and cotton production areas were used as surrogate crops for high potential use areas of acetochlor within areas identified using GlobCover land use data and the Spatial Production Allocation Model agricultural statistics data. The geospatial analysis identified approximately 462 million ha of potentially vulnerable soils

However, not only this insecticide but also cadmium was found in the agricultural wastewater in close proximity to industrial areas.

Bulletin Board

Technical

MAY. 08, 2020

in the Sahel region of which 65.7 million ha are within agricultural areas. An adjustment for corn and cotton production areas showed that 2.2 million ha or 3.3% of agricultural fields could have potential restrictions for acetochlor use. Approximately 0.159 million ha of soils or 0.24% of agricultural fields are in the presence of shallow groundwater, defined by depth < 9 m. In addition, 0.0128 million ha or 0.02% were determined to be adjacent to surface water bodies. To understand the uncertainty associated with the use of specific land cover datasets, an overlay assessment was conducted using alternative data sources. Overlap between selected land cover datasets in the Sahel region varies and ranges from 24.7% to 75.5% based on a merged 2009 GlobCover and CCI LC datasets. In comparison with the merged 2005 and 2009 GlobCover dataset, the cropland overlaps range from 38.9% to 85.0%. This demonstrates that the choice of land cover dataset can have a significant impact on a spatial assessment. Results from this assessment demonstrate that only a small fraction of vulnerable agricultural soils across the region may be a risk for contamination by acetochlor of groundwater or surface resources, based on product label recommendations. Given the availability of spatial data in a region, the methods contained herein may additionally be used in other localities to provide similar information that can be helpful for water quality management.

Authors: Hoogeweg C, Kearns B, Pai N, Thomas M, van Wesenbeeck I, Kirk A, Baxter J, Acetochlor Registration Partnership

Full Source: PLoS One. 2020 May 1;15(5):e0230990. doi: 10.1371/journal.pone.0230990. eCollection 2020.

Sustainable and ecofriendly approach of managing soil born bacterium *Ralstonia solanacearum* (Smith) using dried powder of *Conyza canadensis*

2020-04-01

Bacterial wilt disease caused by *Ralstonia solanacearum* is a devastating plant disease that inflicts heavy losses to the large number of economic host plants it infects. The potential of dried powder of the *Conyza canadensis* to control bacterial wilt (BW) of tomato was explored in vitro and in planta. Three application times (16 days before transplanting (DBT), 8 DBT and 0 DBT), three plastic-mulch durations (10 days plastic mulching (DPM), 5DPM and 0DPM) and four doses viz. 0 g, 8 g, 16 g and 24 g of the plant powder were evaluated. SEM analysis was also conducted to observe the change in bacterial cell morphology. Ethanol extract of dried *C. canadensis* in different concentrations inhibited the in vitro growth of *R. solanacearum* by as much as 98% of that produced by ampicillin. As

The potential of dried powder of the *Conyza canadensis* to control bacterial wilt (BW) of tomato was explored in vitro and in planta.

Bulletin Board

Technical

MAY. 08, 2020

evident from the scanning electron micrograph, the highest concentration produced severe morphologic changes, such as rupture of the bacterial cell walls and cell contents leaked out. Results from application time and dose experiment demonstrated that the highest powder dose viz. 24 g kg^{-1} mixed with infested soil 16 DBT gave maximum root length ($34.0 \pm 2.5 \text{ cm}$), plant height ($74.3 \pm 4.7 \text{ cm}$), fresh biomass ($58.3 \pm 4.3 \text{ g}$), reduction in bacterial population ($1.52 \log_{10}$) and resulted in lowest AUDPC value (1156.6). In case of mulching duration and dose experiment the maximum root length ($39.6 \pm 3.2 \text{ cm}$), plant height ($78.3 \pm 5.8 \text{ cm}$), fresh biomass ($65.6 \pm 4.9 \text{ g}$) reduction in bacterial population ($1.59 \log_{10}$) and lowest AUDPC value (1251.6) was achieved through the application of highest powder dose viz. 24 g kg^{-1} and longest plastic mulching duration of 10 DPM. The better results of highest dose and longer application time can be explained on the basis of higher amounts of anti-microbial plant bio-active compounds in highest dose and the longer exposure time of the pathogen to these chemicals. The better results of longer mulching duration are due to faster and more complete decomposition (because of 10-days-long plastic-mulch-provided increased solar heat) of the dried powder which produced more amounts of volatile and non-volatile bactericidal compounds. Our results clearly suggest that the use of 24 g kg^{-1} dried plant powder of *C. canadensis* plastic-mulched for two weeks could be used as a reliable component of the integrated disease management program against BW.

Authors: Chen K, Khan RAA, Cao W, Ling M

Full Source: Pathogens. 2020 Apr 27;9(5). pii: E327. doi: 10.3390/pathogens9050327.

Cigarette waste: Assessment of hazard to the environment and health in Riyadh city

2020-05-01

Cigarette waste/litter is considered a major environmental contamination problem worldwide as trillions of cigarettes are smoked worldwide and a large part of that, cigarette waste, is disposed of in the open areas including roads, parks, and streets, etc. cigarette litter is the most commonly found litter. It is mainly cigarette filter, made of cellulose acetate, and unburnt part of the tobacco filler. Filters from smoked cigarettes contain a significant amount of tar trapped in it. The tar contains thousands of chemicals and heavy metals. Both of these organic and inorganic constituents have been reported to be toxic to humans and cause a variety of diseases including inflammatory lung diseases, cardiovascular diseases, and cancers. Cigarette litter is a significant

Both of these organic and inorganic constituents have been reported to be toxic to humans and cause a variety of diseases including inflammatory lung diseases, cardiovascular diseases, and cancers.

Bulletin Board

Technical

MAY. 08, 2020

environmental concern as the chemicals and heavy metals can leach into the soil or water sources and pose threat to animals and plants, from there they can enter into the food chain as well. Several reports indicate toxicities to aquatic and terrestrial animals as they consumed cigarette litter. In the present investigation, cigarette litter was collected from 28 randomly selected locations in the Riyadh city to assess the risk to the environment. Cigarette litter, in the form of cigarette butts, was collected, counted, weighed and analyzed for heavy metal content. Data indicate the presence of a significant amount of cigarette litter on roadsides, streets, and parks in the Riyadh city. However, the investigation had its limitations as it did not focus on the absolute amount of cigarette litter vs the time. It also did not consider the amount of cigarette litter percent in the total waste discarded. The investigation presents the results of the screening of the cigarette litter present on the Riyadh city roads, streets, and parks. The findings raise concerns regarding the hazards the cigarette litter poses to the environment and human health. The investigation sheds the light on this unexplored aspect of smoking-associated issues in the Kingdom of Saudi Arabia.

Authors: Qamar W, Abdelgalil AA, Aljarboa S, Alhuzani M, Altamimi MA
Full Source: Saudi Journal of Biological Sciences. 2020 May;27(5):1380-1383. doi: 10.1016/j.sjbs.2019.12.002. Epub 2019 Dec 16.

PHARMACEUTICAL/TOXICOLOGY

A review of the drug-drug interactions of the antiepileptic drug brivaracetam

2020-04-09

Brivaracetam is an antiepileptic drug (AED) indicated for the treatment of focal seizures, with improved safety and tolerability vs first-generation AEDs. Brivaracetam binds with high affinity to synaptic vesicle protein 2A in the brain, which confers its antiseizure activity. Brivaracetam is rapidly absorbed and extensively biotransformed, and exhibits linear and dose-proportional pharmacokinetics at therapeutic doses. Brivaracetam does not interact with most metabolizing enzymes and drug transporters, and therefore does not interfere with drugs that use these metabolic routes. The favorable pharmacokinetic profile of brivaracetam and lack of clinically relevant drug-drug interactions with commonly prescribed AEDs or oral contraceptives allows administration without dose adjustment, and avoids potential untoward events from decreased efficacy of an AED or oral contraceptive due to a drug-drug interaction. Few agents have been reported to affect the pharmacokinetics of brivaracetam. The strong

Brivaracetam does not interact with most metabolizing enzymes and drug transporters, and therefore does not interfere with drugs that use these metabolic routes.

Bulletin Board

Technical

MAY. 08, 2020

enzyme-inducing AEDs carbamazepine, phenytoin and phenobarbital/primidone have been shown to moderately lower brivaracetam plasma concentrations, with no adjustment of brivaracetam dose needed. Dose adjustment should be considered when brivaracetam is coadministered with the more potent CYP inducer, rifampin. Additionally, caution should be used when adding or ending treatment with the strong enzyme inducer, St. John's wort. In summary, brivaracetam (50-200 mg/day) has a favorable pharmacokinetic profile and is associated with few clinically relevant drug-drug interactions.

Authors: Moseley BD, Chanteux H, Nicolas JM, Laloyaux C, Gidal B, Stockis A

Full Source: *Epilepsy Research*.2020 Apr 9;163:106327. doi: 10.1016/j.eplesyres.2020.106327. [Epub ahead of print]

The association between urinary levels of 1,3-butadiene metabolites, cardiovascular risk factors, microparticles, and oxidative stress products in adolescents and young adults

2020-04-20

1,3-Butadiene (BD) is a synthetic colorless gas used in the production of synthetic rubber and polymers. Exposure to BD has been reported to increase oxidative stress and accelerate atherosclerosis in vitro and in animal studies. In occupational studies, BD exposure has been linked to cardiovascular disease (CVD). However, no previous research has been reported on whether BD exposure is associated with CVD risk factors and oxidative stress in the general population. We recruited 853 young participants to study the correlation between urinary levels of the BD metabolite, N-acetyl-S-(3,4-dihydroxybutyl)-L-cysteine (DHBMA), CVD risk factors, serum levels of endothelial microparticles and platelet microparticles, and the urinary levels of 8-hydroxydeoxyguanosine (8-OHdG). The results showed the DHBMA levels were positively correlated with low-density lipoprotein-C, carotid intima-media thickness (CIMT), CD31+/CD42a - counts (endothelial apoptosis markers), and urinary 8-OHdG levels. Moreover, DHBMA levels were negatively correlated with CD62 P counts (platelet activation marker). The correlation between DHBMA, CIMT, and 8-OHdG was more evident when the levels of CD31+/CD42a - or CD62 P were above 50%. In conclusion, we reported that the urinary levels of DHBMA were associated with the lipid profile, CIMT,

Exposure to BD has been reported to increase oxidative stress and accelerate atherosclerosis in vitro and in animal studies.

Bulletin Board

Technical

MAY. 08, 2020

microparticles, and marker of oxidative stress in this young population. Future studies on BD exposure and atherosclerosis are needed.

Authors: Lin CY, Lee HL, Jung WT, Sung FC, Su TC

Full Source: Journal of hazardous materials. 2020 Apr 20;396:122745. doi: 10.1016/j.jhazmat.2020.122745. [Epub ahead of print]

Predictors with regard to ingestion, inhalation and dermal absorption of estimated phthalate daily intakes in pregnant women: The Barwon infant study

2020-04-28

Human exposure to phthalate chemicals, used in consumer product plastics, occurs throughout the day. Phthalate levels in pregnant women are associated with offspring health effects including obesity and neurodevelopmental problems. Knowledge of predictors of exposure is necessary in order to effectively reduce phthalate exposure. The present study aims to identify predictors of phthalate levels in Australian pregnant women from the Barwon Infant study birth cohort. Maternal urine samples from 841 women were analyzed for phthalate metabolites. Maternal diet and food preparation practices, use of volatile household products, household characteristics and personal care product use were assessed with questionnaires. All maternal urine contained phthalate metabolites. Maternal prenatal high-fat milk consumption was associated with higher benzyl butyl phthalate (BBzP) ($p < 0.001$), and bis(2-ethylhexyl) phthalate (DEHP) ($p = 0.0023$). Higher phthalate levels were associated with consumption of tinned food (fish and tomatoes). Diethyl phthalate (DEP) levels were significantly higher when women reported using air freshener (35% increase, $p = 0.01$), aerosols (40% increase, $p = 0.005$), hair treatment chemicals (28% increase, $p = 0.031$), and chlorine (34% increase, $p = 0.009$) compared to no use. Maternal phthalate levels did not vary by reported plastic avoidance during pregnancy. The study showed that phthalate exposure is ubiquitous and increased by multiple factors. Future intervention studies to reduce phthalate levels among pregnant women will need to take into account the variety of sources identified in this study.

Authors: Sugeng EJ, Symeonides C, O'Hely M, Vuillermin P, Sly PD, Vijayarathy S, Thompson K, Pezic A, Mueller JF, Ponsonby AL, Barwon Infant Study Investigatory Group

Full Source: Environment International. 2020 Apr 28;139:105700. doi: 10.1016/j.envint.2020.105700. [Epub ahead of print]

Phthalate levels in pregnant women are associated with offspring health effects including obesity and neurodevelopmental problems.

Bulletin Board

Technical

MAY. 08, 2020

The selected epigenetic effects of aminomethylphosphonic acid, a primary metabolite of glyphosate on human peripheral blood mononuclear cells (in vitro)

2020-04-30

Aminomethylphosphonic acid (AMPA) is a primary metabolite of glyphosate and amino-polyphosphonate. We have determined the effect of AMPA on selected epigenetic parameters and major cell cycle drivers in human peripheral blood mononuclear cells (PBMCs). The cells were incubated with AMPA at 0.5, 10 and 250 μM for 24 h. The performed analysis included: global DNA methylation by colorimetric measurement of 5-methylcytosine in DNA, methylation in the promoter regions of selected tumor suppressor genes (P16, P21, TP53) and proto-oncogenes (BCL2, CCND1) as well as the expression profile of the indicated genes by Real-Time PCR assays. The obtained results have revealed significant reduction of global DNA methylation level in PBMCs exposed to AMPA. Investigated xenobiotic changed methylation pattern of the P21 and TP53 suppressor gene promoters, but in case of other analyzed genes: P16, BCL2 and CCND1 no statistically significant changes have been noted. Gene profiling have shown that AMPA only changed the expression of CCND1. Summing up, our results have revealed a small potential disturbance in methylation processes and the absence of changes in expression of tested tumor suppressor genes (P16, P21, TP53) and protooncogenes (BCL2) in human PBMCs exposed to AMPA.

Authors: Woźniak E, Reszka E, Jabłońska E, Mokra K, Balcerczyk A, Huras B, Zakrzewski J, Bukowska B

Full Source: Toxicology in vitro: an international journal published in association with BIBRA. 2020 Apr 30:104878. doi: 10.1016/j.tiv.2020.104878. [Epub ahead of print]

We have determined the effect of AMPA on selected epigenetic parameters and major cell cycle drivers in human peripheral blood mononuclear cells (PBMCs).

Epidemiology of bacteria and viruses in the respiratory tract of humans and domestic pigs

2020-05-01

Bacteria and viruses were analysed in the upper respiratory tract of symptomatic pig-farmers and their domestic pigs. 86 human nasal and 495 (50 pools) porcine snout swabs were collected in Schleswig-Holstein, Germany. Staphylococcus (S.) aureus (62.8%, 54/86), human rhino- and coronaviruses (HRV, 29.1%, 25/86; HCoV, 16.3%, 14/86) were frequently detected in humans while Haemophilus parasuis (90.0%, 45/50), Mycoplasma hyorhinis (78.6%, 11/14), Enterovirus G (EV-G, 56.0%, 28/50), and S. aureus (36.0%, 18/50), respectively, were highly prevalent

Bulletin Board

Technical

MAY. 08, 2020

in pigs. The detection of *S. aureus* in human follow-up samples indicates a carrier status. The methicillin-resistant phenotype (MRSA) was identified in 33.3% (18/54) of nasal swabs and in one of 18 (5.6%) of pooled snout swabs tested positive for *S. aureus*. Strains were indicative of the livestock-associated clonal complex CC398, with t011 being the most common staphylococcal protein a type. Enterobacterales and non-fermenters were frequently isolated from swabs. Their detection in follow-up samples suggests a carrier status. All were classified as being non-multiresistant. There was no example for cross-species transmission of viruses. In contrast, transmission of *S. aureus* through occupational contact to pigs seems possible. The study contributes to the "One Health" approach.

Authors: Bunke J, Receveur K, Christin Oeser A, Gutschmann I, Schubert S, Podschun R, Zell R, Fickenscher H, Krumbholz A

Full Source:

OCCUPATIONAL

Occupational skin conditions on the frontline: A survey among 484 Chinese healthcare professionals caring for Covid-19 patients

2020-05-03

The 2019-nCoV outbreak occurred in Wuhan, China in December 2019(1). This unprecedented virus has caused global pandemic and over 2,300,000 cases worldwide in total number(2), which has been bringing tremendous pressure and challenges to medical institutions and clinical staff around the world. 2019-nCoV can be transmitted by droplets primarily, while it has been reported that surface contact transmission exists as well(3). Keeping the integrity of skin barrier is a critical method to prevent the spread of 2019-nCoV, since skin is the first line of defense of human body(4). It is of prime importance to ensure and maintain the skin clean, sterilized and protected of clinical health care staff during the fight against the epidemic. Self-protection of the medical staff is essential, however, utilizing protective equipment such as goggles, masks and protective clothing continuously impairs skin integrity and the skin damage caused by the respective protective measures must be taken seriously.

Authors: Pei S, Xue Y, Zhao S, Aleander N, Mohammad G, Chen X, Yin M

Full Source: Journal of the European Academy of Dermatology and Venereology: JEADV. 2020 May 3. doi: 10.1111/jdv.16570. [Epub ahead of print]

Keeping the integrity of skin barrier is a critical method to prevent the spread of 2019-nCoV, since skin is the first line of defense of human body.

Bulletin Board

Technical

MAY. 08, 2020

Bone mineral density in population long-term exposed to rare earth elements from a mining area of China

2020-05-02

This study aims to investigate the effects of individuals' exposure to rare earth elements (REEs) on bone metabolism. Adopting the inductively coupled plasma mass spectrometry, we measured REEs and eight other elements (Ca, Fe, Cu, Na, K, Zn, Mg, and P) in the hair of 53 miners exposed to REEs from Baiyunebo and 57 healthy farmers as the control group. Furthermore, bone mineral density (BMD) in both groups was assessed by dual-energy X-ray absorptiometry. Analysis of variance showed that the concentrations of La, Ce, Pr, Nd, Tb, Ho, Tm, and Yb in male hair of exposed group were significantly higher compared with the control group, whereas the concentrations of Ca and Fe in exposed group were significantly lower; the results of female hair, except for Ce, Tb, Ho, Tm, and Yb, were consistent with male hair. Student's t test showed that the BMD of exposed males at lumbar vertebrae, femoral neck, greater trochanter, and intertrochanter was significantly lower than that of controls, and exposed females reported lower BMD values at lumbar vertebrae and femoral neck. Multiple linear regression analysis showed that concentrations of differential REEs were inversely related to BMD in males, and concentrations of Ca and Fe were positively related to BMD both in males and females. Our study suggests that long-term environmental and occupational exposure leads to REE accumulation, and a low level of iron and calcium due to the competitive binding of REEs, which together induce bone metabolism disorders, and further reduce BMD.

Authors: Liu H, Liu H, Yang Z, Wang K

Full Source: Biological trace element research. 2020 May 2. doi: 10.1007/s12011-020-02165-0. [Epub ahead of print]

...We measured REEs and eight other elements (Ca, Fe, Cu, Na, K, Zn, Mg, and P) in the hair of 53 miners exposed to REEs from Baiyunebo and 57 healthy farmers as the control group.

Effects of ambient PM 2.5 and particle-bound metals on the healthy residents living near an electric arc furnace: A community-based study

2020-04-20

Fine particulate matter (PM_{2.5}) emitted from electric arc furnaces (EAFs) poses health concerns. However, little research has been done on the impact of EAF on the health of community residents. This cross-sectional study conducted a PM_{2.5} exposure assessment and health examination of community residents living near an EAF. A total of 965 residents aged 40-90 years were recruited. The residents' exposure to PM_{2.5} was categorized according to the distance of their residence from the EAFs

Bulletin Board

Technical

MAY. 08, 2020

(<500, 500-1000, 1000-1500, 1500-2000, and > 2000 m). Average ambient PM_{2.5} concentrations were estimated using a hybrid kriging/land-use regression (LUR) model. In addition, we selected two air-sampling sites to monitor the 2-year levels of PM_{2.5} and particle-bound metals. A spot urine sample and blood samples were collected and ten heavy metal concentrations in the blood were analyzed. Inflammation- and oxidative stress-related biomarkers were measured. The associations between environmental factors and a biochemical examination were estimated using a generalized linear model. Active air sampling and hybrid kriging/LUR model simulation indicated increased levels of PM_{2.5} near the EAF. The metal concentrations in PM_{2.5} included Fe, Pb, Mn, Ni, As, Cu, Ni, Zn, and Al, which also significantly increased near the EAF. PM_{2.5} levels were significantly associated with an increased total cholesterol-high-density lipoprotein (TC/HDL) ratio. High levels of PM_{2.5} and malondialdehyde were associated with a 1.72-fold increased risk of TC/HDL ratio ≥ 4 (95% CI: 1.12-2.65) after adjusting for potential confounding factors. Blood Pb levels were significantly associated with increased systolic and diastolic blood pressure and decreased estimated glomerular filtration rate but negatively associated with distance from the EAF. The results show that people living near EAFs should pay more attention to adverse health problems, including atherogenic dyslipidemia, hypertension, and chronic kidney disease associated with exposure to PM_{2.5} and particle-bound metals. Authors: Chung CJ, Wu CD, Hwang BF, Wu CC, Huang PH, Ho CT, Hsu HT Full Source: The science of the total environment. 2020 Apr 20;728:138799. doi: 10.1016/j.scitotenv.2020.138799. [Epub ahead of print]

Furthermore, our results indicated a possible clastogenic and aneugenic effect of pesticides on the genetic material of the farmers exposed.

Assessment of genetic effects and pesticide exposure of farmers in NW Greece

2020-04-20

The present study aims at evaluating potential genotoxic and cytotoxic effects caused by the occupational exposure of farmers to pesticide mixtures in the Aitolokarnania Prefecture (Greece). The aforementioned assessment was conducted through in vivo Cytokinesis Block Micronucleus assay (CBMN assay) in peripheral blood lymphocytes, in relation to chemical analysis of pesticide residues in blood samples. The exposure of the farmers' population studied to different combinations of pesticides induced significant differences in the frequencies of micronuclei (MN) compared to those of the control group. Furthermore, our results indicated a possible clastogenic and aneugenic effect of pesticides on the genetic material of the farmers exposed. Five pesticides (trifluralin, chlorpyrifos methyl, metolachlor, fenthion and dimethoate) and three

Bulletin Board

Technical

MAY. 08, 2020

metabolites (fenthion sulfone, fenthion sulfoxide and 4,4' DDE) were detected in the 62.5% of blood samples, with mean concentrations ranging from 0.4 ng/ml to 48 ng/ml. Since the farmers studied probably exhibit detectable levels of systematic exposure to the pesticides applied, continuous educational programs focused on the rational and safe use of pesticides, together with implementation of risk communication strategies among farmers are highly recommended.

Authors: Moshou H, Karakitsou A, Yfanti F, Hela D, Vlastos D, Paschalidou AK, Kassomenos P, Petrou I

Full Source: Environment research. 2020 Apr 20;186:109558. doi: 10.1016/j.envres.2020.109558. [Epub ahead of print]

Elevated occupational exposure to chlorinated phosphate esters at a construction materials manufacturing plant

2020-04-28

BACKGROUND:

Numerous studies have documented that the general population is widely exposed to organophosphate esters (OPEs), yet studies on the emissions of OPEs in the industrial application processes and their occupational exposure are scarce. The aim of this study was to assess the exposure to OPEs for workers engaged in OPE-retarded construction material manufacturing plant in China.

METHOD:

Paired dust samples (12 samples each time) from an OPEs retarded building materials manufacturing plant during the plant uptime and downtime have been analyzed for tris(2-chloroethyl)-phosphate (TCEP), tris(2-chloroisopropyl) phosphate (TCPP), and other commonly used OPEs. Moreover, nine OPEs metabolites (mOPEs) in urine samples (n = 42) from fourteen workers who engaged in this plant were also measured. The daily exposure doses to OPEs were estimated from the measured urinary concentrations of corresponding mOPEs.

RESULTS:

Thirteen out of fourteen studied OPEs (except for tri-n-propyl phosphate, TnPP) were determined in all dust samples from the manufacturing plant, and TCEP and TCPP were the predominant compounds in dust collected from the plant uptime and downtime. Overall, the occupationally exposed population had significantly higher ($p < 0.01$) urinary levels of mOPE, especially for bis (2-chloroethyl) phosphate (BCEP), relative to the reference population. Workshop workers who directly involved in the production of OPEs treated products had higher OPEs exposure. Risk assessment revealed that cancer risk (1.5×10^{-6} - 8.5×10^{-4}) for all workers

Overall, the occupationally exposed population had significantly higher ($p < 0.01$) urinary levels of mOPE, especially for bis (2-chloroethyl) phosphate (BCEP), relative to the reference population.

Bulletin Board

Technical

MAY. 08, 2020

was larger than 1×10^{-6} when levels of mOPEs in urine from workers were used for estimating OPEs exposure, revealing moderate to high potential cancer risk to workers from OPEs exposure.

CONCLUSION:

To our knowledge, this is the first study reporting emissions of OPEs in OPE-treated products manufacturing processes and the potential exposure of the occupationally exposed population. OPEs, especially for TCEP and TCPP, present at elevated levels and pose moderate to high potential health risks to the exposed workers, emphasizing the importance of strengthening occupational exposure prevention in similar industries.

Authors: Shi F, Liang K, Liu R, Dong Q, He Z, Xu J, Liu J

Full Source: Environment International. 2020 Apr 28;139:105653. doi: 10.1016/j.envint.2020.105653. [Epub ahead of print]