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CHEMICAL EFFECTS

Methane Emissions and Milk Fatty Acid Profiles in Dairy Cows Fed Linseed, Measured at the Group Level in a Naturally Ventilated Housing and Individually in Respiration Chambers

2020-06-24

The present study evaluated the effects of linseed supplementation on CH₄ emission and milk fatty acid composition in dairy cows measured at the group level in an experimental dairy loose housing using a tracer gas technique and individually in tied stalls and respiration chambers. Cows (2 × 20) were maintained in two separate sections under loose-housing conditions and received a diet supplemented with extruded linseed (L) lipids (29 g/kg dry matter) or a control (C) diet containing corn flour. Subsequently, 2 × 6 cows per dietary group were investigated in a tied-housing system and respiration chambers. Substantially higher proportions of favorable milk fatty acids were recovered in L cows when compared with C cows at the group level, making the analysis of bulk milk a suitable control instrument for retailers. Linseed supplementation resulted in a slightly lower diurnal course of CH₄ emission intensity than the control at the group and individual levels. However, we found no more than a trend for a CH₄ mitigating effect, unlike in other studies supplementing similar linseed lipid levels. Feed supplements in concentrations that lead to a significant reduction in CH₄ emissions must show whether the reduction potential determined at the group and individual levels is comparable.

Authors: Jernej Poteko, Sabine Schrade, Kerstin Zeyer, Joachim Mohn, Michael Zaehner, Johanna O Zeitz, Michael Kreuzer, Angela Schwarm
Full Source: Animals : an open access journal from MDPI 2020 Jun 24;10(6):E1091. doi: 10.3390/ani10061091.

The present study evaluated the effects of linseed supplementation on CH₄ emission and milk fatty acid composition in dairy cows measured at the group level in an experimental dairy loose housing using a tracer gas technique and individually in tied stalls and respiration chambers.

Classified Chemicals in Accordance With the Globally Harmonized System of Classification and Labeling of Chemicals: Comparison of Lists of the European Union, Japan, Malaysia and New Zealand

2020-06

Background: The Globally Harmonized System of Classification and Labeling of Chemicals (GHS) was developed to enhance chemical classification and hazard communication systems worldwide. However, some of the elements such as building blocks and data sources have the potential to

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cause “disharmony” to the GHS, particularly in its classification results. It is known that some countries have developed their own lists of classified chemicals in accordance with the GHS to “standardize” the classification results within their respective countries. However, the lists of classified chemicals may not be consistent among these countries.

Method: In this study, the lists of classified chemicals developed by the European Union, Japan, Malaysia, and New Zealand were selected for comparison of classification results for carcinogenicity, germ cell mutagenicity, and reproductive toxicity. **Results:** The findings show that only 54%, 66%, and 37% of the classification results for each Carcinogen, Mutagen and Reproductive toxicants hazard classes, respectively are the same among the selected countries. This indicates a “moderate” level of consistency among the classified chemicals lists.

Conclusion: By using classification results for the carcinogenicity, germ cell mutagenicity, and reproductive toxicity hazard classes, this study demonstrates the “disharmony” in the classification results among the selected countries. We believe that the findings of this study deserve the attention of the relevant international bodies.

Authors: Mohd Fadhil H A Yazid, Goh Choo Ta, Mazlin Mokhtar

Full Source: Safety and health at work 2020 Jun;11(2):152-158. doi: 10.1016/j.shaw.2020.03.002.

ENVIRONMENTAL RESEARCH

Bioaccumulation and Trophic Transfer of Organophosphate Esters in Tropical Marine Food Web, South China Sea

2020-07-02

Environmental exposure to organophosphate esters (OPEs) continues to be a concern. Little is known about their bioaccumulation and trophodynamics, especially in tropical food webs. This study collected seawater and fifteen types of organism from a tropical ecosystem, South China Sea, to investigate the species-specific compositional, bioaccumulation, and trophic transfer of OPEs. The total concentrations of 11 target OPEs (ng/g dw) in the organisms decreased with the increase of their trophic levels in the order: phytoplankton (922) > zooplankton (660) > oysters (309) > crabs (225) > coral tissues (202) > fishes (58.2). The composition profiles (relative abundances) of OPEs were different among the species of organisms, which is likely affected by metabolism and the physicochemical property of OPEs. The trophic biomagnification

Environmental exposure to organophosphate esters (OPEs) continues to be a concern.

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of triphenyl phosphate (TTP) in the pelagic food web was unexpected and requires further investigation. The trophic magnification factors (TMFs) of OPEs were generally lower in this tropical aquatic food web than in temperate and frigid aquatic food web. Our analysis suggests that there is a significant positive linear correlation between latitude and TMF. Intakes of OPEs through the consumption of the seafood involved in this work does not pose health risk to adults.

Authors: Yang Ding, Minwei Han, Zhiqiang Wu, Ruijie Zhang, An Li, Kefu Yu, Yinghui Wang, Wen Huang, Xiaobo Zheng, Bixian Mai

Full Source: Environment international 2020 Jul 2;143:105919. doi: 10.1016/j.envint.2020.105919.

Risk Assessment of Water Resources Pollution From Transporting of Oil Hazardous Materials (Sanandaj-Marivan Road, Kurdistan Province, Iran)

2020-06-30

Water pollution is one of the most important environmental challenges and also one of the main causes of death in the world. Transporting oil products on roads by trucks and their accidents lead to the release of these chemicals into the environment, resulting in water resources pollution. Thus, the main goal of this study is to evaluate the risk assessment of the water resources pollution in the road of Sanandaj to Marivan, Kurdistan province, Iran. Six scenarios for four types of hazardous materials in two seasons of the years were considered. The road was then segmented, and the probability of accidents in each segment was calculated by the Poisson regression method. Two scenarios were selected for analysis since truck accidents had happened mainly in spring (scenario 1) and winter (scenario 4). According to the results, the total risk of water contamination path is 20% very low, 19% low, 29% moderate, 28% high, and 4% very high. Also, according to scenario 1, 14% of the total area of the study area is very low risk, 23% low risk, 15% medium risk, 6% high risk, and 42% are very high risk. Based on scenario 4, 39% of the total area of the study area has a very low risk, 44% low risk, 13% medium risk, 4% high risk. This simply means that this road is not very suitable for transporting hazardous oil products.

Authors: Baha Ebrahimi, Salman Ahmadi, Kamran Chapi, Hazhir Amjadi

Full Source: Environmental science and pollution research international 2020 Jun 30. doi: 10.1007/s11356-020-09886-8.

Water pollution is one of the most important environmental challenges and also one of the main causes of death in the world.

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PHARMACEUTICAL/TOXICOLOGY

COVID-19 and Frequent Use of Hand Sanitizers; Human Health and Environmental Hazards by Exposure Pathways

2020-06-27

Till date no medication or vaccine is available to cope with the COVID-19 infection and infection rate is increasing drastically across the globe. Only preventive measures and healthy life style with efficient immune system have been suggested by WHO to fight and stay safe from COVID-19. WHO recommended alcohol based hand sanitizers for frequent hand hygiene, which are mainly made up from ethanol, isopropyl alcohols, hydrogen peroxides in different combinations. These preparations may become toxic to human health and environment when misused. These chemicals have known toxic and hazardous impact on environment when released by evaporation. In early five months of 2020, American Association of Poison Control Center reported 9504 alcoholic hand sanitizer exposure cases in children under the age of 12 years and recognized that even a small amount of alcohol can cause alcohol poisoning in children that is responsible for confusion, vomiting and drowsiness, and in severe cases, respiratory arrest and death. Furthermore, frequent usage of said hand sanitizers has reported increased chance of antimicrobial resistance and chance of other viral diseases. Current review is designed with main objective to highlight the toxic and serious health risks to human health and environment by frequent using hand hygiene products with alcohols based formulations.

Authors: Adeel Mahmood, Maryam Eqan, Saher Pervez, Huda Ahmed Alghamdi, Amtul Bari Tabinda, Abdullah Yasar, Kathirvel Brindhadevi, Arivalagan Pugazhendhi

Full Source: The Science of the total environment 2020 Jun 27;742:140561. doi: 10.1016/j.scitotenv.2020.140561.

Role of Inhaled Methoxyflurane in the Management of Acute Trauma Pain

2020-06-25

Adequate treatment of trauma pain is an integral part of the management of trauma patients, not just for ethical reasons but also because undertreated pain can lead to increased morbidities and worse long-term outcomes. Trauma pain management presents challenges in the pre-hospital setting, particularly in adverse or hostile environments as

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well as in busy emergency departments (EDs). Inhaled methoxyflurane, administered at analgesic doses via a disposable inhaler, has recently become available in Europe for the emergency treatment of moderate to severe pain in conscious adult trauma patients. A growing body of evidence demonstrates that inhaled methoxyflurane is well tolerated and effective in providing a rapid onset of analgesia. In this paper, we discuss the rationale for methoxyflurane use in trauma pain management, data from clinical trials recently conducted in Europe, its efficacy and safety profile compared to current standard treatments, its place in therapy and organizational impact. We conclude that inhaled methoxyflurane represents an effective treatment option in the different settings where trauma patients require rapid and flexible pain resolution, with potential organizational advantages.

Authors: Andrea Fabbri, Germana Ruggiano, Sergio Garcia Collado, Agnes Ricard-Hibon, Umberto Restelli, Giovanni Sbrana, Franco Marinangeli, Alberto Farina, Frank Coffey

Full Source: Journal of pain research 2020 Jun 25;13:1547-1555. doi: 10.2147/JPR.S252222

Developmental Exposure of California Mice to Endocrine Disrupting Chemicals and Potential Effects on the Microbiome-Gut-Brain Axis at Adulthood

2020-07-02

Xenoestrogens are chemicals found in plant products, such as genistein (GEN), and in industrial chemicals, e.g., bisphenol A (BPA), present in plastics and other products that are prevalent in the environment. Early exposure to such endocrine disrupting chemicals (EDC) may affect brain development by directly disrupting neural programming and/or through the microbiome-gut-brain axis. To test this hypothesis, California mice (*Peromyscus californicus*) offspring were exposed through the maternal diet to GEN (250 mg/kg feed weight) or BPA (5 mg/kg feed weight, low dose- LD or 50 mg/kg, upper dose-UD), and dams were placed on these diets two weeks prior to breeding, throughout gestation, and lactation. Various behaviors, gut microbiota, and fecal metabolome were assessed at 90 days of age. The LD but not UD of BPA exposure resulted in individuals spending more time engaging in repetitive behaviors. GEN exposed individuals were more likely to exhibit such behaviors and showed socio-communicative disturbances. BPA and GEN exposed females had increased number of metabolites involved in carbohydrate metabolism and synthesis. Males exposed to BPA or GEN showed alterations in lysine degradation and phenylalanine and tyrosine metabolism. Current findings

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indicate cause for concern that developmental exposure to BPA or GEN might affect the microbiome-gut-brain axis.

Authors: Sarabjit Kaur, Saurav J Sarma, Brittney L Marshall, Yang Liu, Jessica A Kinkade, Madison M Bellamy, Jiude Mao, William G Helferich, A Katrin Schenk, Nathan J Bivens, Zhentian Lei, Lloyd W Sumner, John A Bowden, Jeremy P Koelmel, Trupti Joshi, Cheryl S Rosenfeld

Human Phase I in Vitro Liver Metabolism of Two Bisphenolic Diglycidyl Ethers BADGE and BFDGE

2020-06-29

Root canal sealers are commonly used to endodontically treat teeth with periapical infections. Some root canal sealers based on epoxy resin contain bisphenol A diglycidyl ether (BADGE) and bisphenol F diglycidyl ether (BFDGE). The presence of these chemicals is of concern due to the close contact to the blood stream at the apex and the long setting times of up to 24 h. These chemicals, or any of their degradation products or metabolites, can then exert their toxic effects before being excreted. This study aimed to identify the phase I in vitro biotransformation products of BADGE and BFDGE using human liver microsomes. During incubation with microsomal fractions, the epoxides were rapidly hydrolysed in a NADPH independent manner resulting in the formation of BADGE.2H₂O and BFDGE.2H₂O. Further, oxidative reactions, such as hydroxylation and carboxylation, generated other BADGE metabolites, such as BADGE.2H₂O-OH and BADGE.H₂O.COOH, respectively. For BFDGE, further oxidation of BFDGE.2H₂O led to the newly reported carboxylic acid, BFDGE.H₂O.COOH. In total, three specific metabolites have been identified which can serve in future human biomonitoring studies of BADGE and BFDGE.

Authors: Philippe Vervliet, Siemon de Nys, Radu Corneliu Duca, Imke Boonen, Lode Godderis, Marc Elskens, Kirsten L van Landuyt, Adrian Covaci

Full Source: Toxicology letters 2020 Jun 29;332:7-13. doi: 10.1016/j.toxlet.2020.06.022.

Full Source: Scientific reports 2020 Jul 2;10(1):10902. doi: 10.1038/s41598-020-67709-9.

Root canal sealers are commonly used to endodontically treat teeth with periapical infections.

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OCCUPATIONAL

A Total Worker Health Approach to Skin Exposure Assessment: Experiences From the Firefighter Cancer Initiative

2020-07-03

Increasing scientific evidence suggests that addressing complex, wide-ranging concerns among worker populations should include the integration of traditional occupational safety and health with often siloed worksite wellness programs. The Total Worker Health (TWH) approach developed by the National Institute for Occupational Safety and Health can support skin cancer prevention efforts by integrating organizational-level policies, programs, and practices that strategically merge both skin protection from work-related safety and health hazards with promotion of skin illness prevention efforts. In the firefighter workforce, epidemiologic studies suggest an increased risk of skin cancer despite the use of personal protective equipment during fire incident response. Mechanisms for dermal absorption of carcinogenic compounds such as polycyclic aromatic hydrocarbons have given insight into how these hazardous chemicals can enter the skin and increase cancer risk. Mitigation of carcinogenic exposures requires a TWH approach that merges skin protection and promotion, routine surveillance, skin health assessment, worksite-based interventions, and regular evaluation of program activities. In this commentary, an example of a TWH approach is provided from the Firefighter Cancer Initiative (FCI), a transdisciplinary initiative focused at addressing excess burden of cancer in the firefighter workforce. The FCI builds on the TWH approach through the following components: (i) organizational leadership commitment; (ii) elimination of workplace hazards and promotion of worker well-being; (iii) engagement of workers in program design and delivery; (iv) ensuring confidentiality and privacy in program participation; and (v) integrating systems effectively. Occupational hygienists have strong potential to play a crucial role beyond traditional risk assessment, exposure assessment, and health protection that further includes skin health promotion and integration of related programs into a TWH framework.

Authors: Alberto J Caban-Martinez, Jeff Hughes, Christopher Bator

Full Source: Annals of work exposures and health 2020 Jul 3;wxaa066. doi: 10.1093/annweh/wxaa066.

Increasing scientific evidence suggests that addressing complex, wide-ranging concerns among worker populations should include the integration of traditional occupational safety and health with often siloed worksite wellness programs.

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Risk of Mercury Exposure During Childhood: A Review of Sri Lankan Situation

2020-07-03

Sri Lanka had ratified the Minamata convention in the year 2017 and is planning to phase out Mercury by 2020. Mercury thermometers and compact fluorescent light bulbs are abundant at hospitals, households and schools. Limitations in safe disposal and containment mechanisms have enhanced the unregulated e-waste collection and extraction. Sri Lanka has plentiful lagoons, fishing bays, and inland irrigation systems. Fish consumption is high, especially around the coastal belt. Mercury can bioaccumulate in humans by the consumption of fish from contaminated sources. Children are at risk of exposure in their living environments and via food. A multicountry study done across three oceans on Mercury threat to women & children revealed, lagoon pollution from industrial Mercury emissions in Sri Lanka, possessing high Mercury among local females who consume fish from that lagoon. The mean hair Mercury level in coastal areas with high fish consumption exceeded the reference dose even among children. Aquatic life and crop studies revealed a mixed picture of Mercury levels which some are lower and some are higher than the permissible levels. Studies on environmental Mercury levels and correlations with health effects among children will help to fill the data gap. Public awareness of the health effects of Mercury and mechanisms of Mercury disposal should be established.

Authors: Himan K A Galappaththi, Inoka Suraweera

Full Source: [Reviews on environmental health 2020 Jul 3;/j/reveh.ahead-of-print/reveh-2020-0024/reveh-2020-0024.xml](#). doi: 10.1515/reveh-2020-0024.

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