Contents

(click on page numbers for links)

ENVIRONMENTAL
Transformation and biodegradation of 1,2,3- trichloropropane (TCP) .......... 3
Application progress of safe marker gene pmi for fruit tree transformation .......... 3

MEDICAL
Application and Validation of an Impedance- Based Real Time Cell Analyser to Measure the Toxicity of Nanoparticles Impacting Human Bronchial Epithelial Cells ................................................................. 4
Persistent DNA Damage Measured by Comet Assay of Sprague Dawley Rat Lung Cells after Five Days of Inhalation Exposure and 1 Month Post-Exposure to Dispersed Multi-Wall Carbon Nanotubes (MWCNTs) Generated by New MWCNT Aerosol Generation System .......... 5
Compliance, safety, and effectiveness of fixed dose artesunate-amodiaquine for presumptive treatment of non-severe malaria in the context of home management of malaria in Madagascar .......... 6
Is safety infliximab during pregnancy in patients with inflammatory bowel disease? ................................................................. 7
Effects of early pravastatin treatment on acute coronary syndrome among the middle-and-old-aged patients ................................................................. 8

OCCUPATIONAL
Evaluation of genotoxic effects of lead in pottery-glaze workers using micronucleus assay, alkaline comet assay and DNA diffusion assay .. 8
Quick management of accidental tritium exposure cases .......................................... 9
Occupational solvent exposure, genetic variation of DNA repair genes, and the risk of non-Hodgkin's lymphoma ................................................................. 10
An examination of blood lead levels in Thai nielloware workers .............................. 11
Asbestos exposure among mitering workers ................................................................. 11

PUBLIC HEALTH
The occurrence of synthetic musks in human breast milk in Sichuan, China ................................................................. 12
PCBs and OH-PCBs in serum from children and mothers in urban and rural U.S. communities ................................................................. 13
Is Saliva a Potential Biomarker of Arsenic Exposure? A Case-Control Study in West Bengal, India ................................................................. 14
Contents

New Insight into Biomarkers of Human Mercury Exposure Using Naturally Occurring Mercury Stable Isotopes .......................................................... 14
Reactive Oxygen Species Alteration of Immune Cells in Local Residents at an Electronic Waste Recycling Site in Northern China .......... 15

SAFETY
Analysis of independent protection layers used in three typical chemical processes .................................................................................................. 16
Acetylene cylinders involved in fire ................................................................................................. 16
Reduction of hazards from copper(I) chloride in a Cu-Cl thermochemical hydrogen production plant ............................................................... 17
This paper presents an overview of methods for the remediation of TCP contaminated water with an emphasis on the possibilities of biodegradation.

Transformation and biodegradation of 1,2,3-trichloropropane (TCP)

1,2,3-Trichloropropane (TCP) is a persistent groundwater pollutant and a suspected human carcinogen. It is also an industrial chemical. Waste that has been formed in large amounts during epichlorohydrin manufacture. In view of the spread of TCP via groundwater and its toxicity, there is a need for cheap and efficient technologies for the cleanup of TCP-contaminated sites. In situ or on-site bioremediation of TCP is an option if biodegradation can be achieved and stimulated. This paper presents an overview of methods for the remediation of TCP contaminated water with an emphasis on the possibilities of biodegradation. Although TCP is a xenobiotic chlorinated compound of high chemical stability, a number of abiotic and biotic conversions have been demonstrated, including abiotic oxidative conversion in the presence of a strong oxidant and reductive conversion by zero-valent zinc. Biotransformations that have been observed include reductive dechlorination, monooxygenase-mediated co metabolism, and enzymic hydrolysis. No natural organisms are known that can use TCP as a carbon source for growth under aerobic conditions, but anaerobically TCP may serve as electron acceptor. The application of biodegradation is hindered by low degradation rates and incomplete mineralisation. Protein engineering and genetic modification can be used to obtain microorganisms with enhanced TCP degradation potential.

Authors: Samin, Ghufrana; Janssen, Dick B.

Full Source: Environmental Science and Pollution Research 2012, 19(8), 3067-3078 (English)

Application progress of safe marker gene pmi for fruit tree transformation

Despite of the production of fertile transgenic plants through transformation mediated by Agrobacterium tumefaciens, transformation efficiency is still low in fruit trees. The mannose selection system employs the phosphomannose isomerase (PMI) gene as selectable gene and the transgenic PMI-expressing cells have acquired the ability to convert mannose-6-phosphate to fructose-6-phosphate. Compared to antibiotic selection system, it has advantages such as high selective efficiency, safety
The aim of this work was to evaluate a novel impedance-based real time cell analyser (RTCA) as a high-throughput method for screening the cytotoxicity of nanoparticles and to validate the RTCA results using a conventional cytotoxicity test (MTT). Nanomaterials are increasingly used in a variety of industrial processes and consumer products. There are growing concerns about the potential impacts for public health and environment of engineered nanoparticles. The aim of this work was to evaluate a novel impedance-based real time cell analyser (RTCA) as a high-throughput method for screening the cytotoxicity of nanoparticles and to validate the RTCA results using a conventional cytotoxicity test (MTT). A collection of 11 inorganic nanomaterials (Ag0, Al2O3, CeO2, Fe0, Fe2O3, HfO2, Mn2O3, SiO2, TiO2, ZnO, and ZrO2) were tested for potential cytotoxicity to a human bronchial epithelial cell, 6HBE14o-. The data collected by the RTCA system was compared to results obtained using a more traditional Me tetrazolium (MTT) cytotoxicity assay at selected time points following application of nanomaterials. The most toxic nanoparticles were ZnO, Mn2O3, and Ag0, with 50% response at concentrations lower than 75 mg/L. There was a good correlation in cytotoxicity measurements between the two methods; however, the RTCA method maintained a distinct advantage in continually following cytotoxicity over time. The results demonstrate the potential for the environment and easy to test. It is also affected by some important factors. The application of this system on fruit trees transformation and its perspective based on the existing literature data are studied. The advantages of this select system, some important factors affecting the transformation efficiency are discussed as well as the approaches in fruit tree genetic transformation using this PMI/mannose system.

Authors: Wang, Hong; Hao, Yan

Full Source: Yuanyi Xuebaolu 2011, 38(5), 997-1002 (Ch)
The current study investigated the inhalation toxicity potential of multiwall CNTs (MWCNTs). Carbon nanotubes (CNTs) have specific physico-chemical properties that are useful for the electronics, automotive, and construction industries. Yet, despite their many advantages, there is a current lack of available information on the human health and environmental hazards of CNTs. For this reason, the current study investigated the inhalation toxicity potential of multiwall CNTs (MWCNTs). Eight-week-old rats were divided into four groups (10 rats in each group), the fresh air control (0mg/m3), low-concentration group (0.16mg/m3), middle-concentration group (0.34mg/m3), and high-concentration group (0.94mg/m3), and the whole body was exposed to MWCNTs for 5 days (6h/day). Lung cells were then isolated from five rats in each group on day 0 and 1 mo after the 5-day exposure, respectively. The MWCNTs were generated by a newly designed generation system, and the MWCNT concentrations in the exposure chambers monitored in accordance with National Institute for Occupational Safety and Health (NIOSH) 0500 using a membrane filter. The MWCNTs were also sampled for an elemental carbon concentration analysis using a glass filter. The animals exhibited no significant body weight changes, abnormal clinical signs, or mortality during the experiment. A single-cell gel electrophoresis assay (Comet assay) was conducted to detect the DNA damage in lung cells obtained from the right lung. As a result, the Olive tail moments were 23.00(1.76, 30.39(1.96, 22.96(1.26, and 33.98(2.21 for the control, low-, middle-, and high-concentration groups, respectively, on day 0 post exposure. Meanwhile, 1 month post exposure, the Olive tail moments were 25.00(2.71, 28.39(3.55, 22.56(1.36, and 31.97(3.16 for the control, low-, middle-, and high-concentration groups, respectively. Thus, the MWCNTs caused a
Compliance, safety, and effectiveness of fixed dose artesunate-amodiaquine for presumptive treatment of non-severe malaria in the context of home management of malaria in Madagascar

2013-06-25

Home management of malaria is recommended for prompt, effective antimalarial treatment in children less than five years of age. Compliance, safety, and effectiveness of the new fixed-dose artesunate-amodiaquine regimen used to treat suspected malaria were assessed in febrile children enrolled in a 24-month cohort study in two settings in Madagascar. Children with fever were asked to visit community health workers. Presumptive antimalarial treatment was given and further visits were scheduled for follow-up. The primary endpoint was the risk of clinical/parasitol treatment failure. Secondary outcomes included fever/parasite clearance, change in Hb levels, and frequency of adverse events. The global clinical cure rate was 98.4% by day 28 and 97.9% by day 42. Reported compliance was 83.4%. No severe adverse effects were observed. The authors concluded that this study provides comprehensive data concerning the clinical cure rate obtained with artesunate-amodiaquine and evidence supporting the scaling up of home management of malaria.

Authors: Ratsimbasoa, Arsene; Ravony, Harintoa; Vonimpaisomihanta, Jeanne-Aimee; Raherinjafy, Rogelin; Jahevitra, Martial; Rapelanoro, Rabenja; Rakotomanga, Jean De Dieu Marie; Malvy, Denis; Millet, Pascal; Menard, Didier

Full Source: American Journal of Tropical Medicine and Hygiene 2012, 86(2), 203-210 (Eng)
During this study, the authors aimed to detect infliximab’s safety in pregnant women in our setting and assess its effect on the foetus drawing on the experience of several hospitals.

Is safety infliximab during pregnancy in patients with inflammatory bowel disease?

2013-06-25

In most cases, inflammatory bowel disease (IBD) debuts at reproductive age. The data available in the literature show infliximab (IFX) to be a safe drug during pregnancy but there is very little evidence about the activity of the disease following drug withdrawal during pregnancy. During this study, the authors aimed to detect the drug’s safety in pregnant women in our setting and assess its effect on the foetus drawing on the experience of several hospitals. Secondly, observe the effect of treatment withdrawal on disease activity during pregnancy. Material and methods: a retrospective study was conducted of women with IBD who had received IFX treatment during pregnancy in five hospitals in Spain. Disease activity was assessed using Crohn’s Disease Activity Index, while UC was assessed using the Truelove- Witts Index in each trimester of pregnancy. Gestational age, weight and diseases in the foetus were detected at birth. The study included 12 women with a mean age of 29 years; 4 had ulcerative colitis and 8 Crohn’s disease, with mean disease duration of 7 years. All but one, who was diagnosed during pregnancy, was receiving IFX treatment at conception. Six patients received uninterrupted treatment throughout the pregnancy, 2 requested voluntary interruption and in 3 cases treatment was interrupted in the third trimester as a precaution. They received a mean IFX dose of 400 mg every 8 week. Of the 6 patients who received continuous treatment, in 50% disease was held in remission. The 6 remaining patients suspended treatment for different reasons, presenting disease recurrence in all but one case (83.3%). Eight deliveries were vaginal and 4 by caesarean section. Newborns presented no congenital anomalies, intrauterine growth retardation or low birth weight and there was only one premature delivery. The authors concluded that although cases included in the study are not significant, in our experience, IFX during pregnancy is a safe treatment for the mother and the foetus. In fact, in our study and in some cases, its withdrawal may lead to a worsening of the disease. However, further control studies are required with larger samples to obtain more representative findings.

Authors: Arias, Federico Arguelles; Laria, Luisa Castro; Barreiro-de Acosta, Manuel; Sanchez, Ma. Valle Garcia; Jimenez, Pedro Guerrero; Garcia, Ma Rosa Gomez; Ruiz, Patricia Cordero; Flores, Eva Iglesias; Camacho, Federico Gomez; Dominguez Munoz, Enrique J.; Gutierrez, Juan Manuel Herrerias

Full Source: Revista Espanola de Enfermedades Digestivas 2012, 104(2), 59-64 (Span)
Effects of early pravastatin treatment on acute coronary syndrome among the middle-and-old-aged patients
2013-06-25
To investigate the clinic efficacy of middle-dose pravastatin in acute coronary syndrome (ACS) treatment among middle-and old-aged patients, one hundred and seven senile ACS patients were divided randomly into three groups. In addition to conventional treatment, patients in group A received pravastatin 40 mg qn, simvastatin 40 mg qn for group B, and simvastatin 80 mg qn for group C. Peripheral lipid concentrations, coagulation function, liver function and adverse drug effects were observed after 3 mo of treatment. Incidence of cardiovascular events were observed for one year through follow-up. Results showed that, after treatment, levels of cholesterol (TC), lowered lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C), t-PA and PAI-1 were statistically different among the 3 groups (P<0.05). Incidence of adverse events and cardiovascular events within one year were also statistically different among the 3 groups (P<0.05). Middle-dose pravastatin was more effective in lowering lipid levels, maintaining normal coagulation function and liver function, and reducing incidence of cardiovascular events.
Authors: Zheng, Xiaofen
Full Source: Zhongguo Quanke Yixue 2011, 14(7A), 2172-2174 (Ch)

OCCUPATIONAL
Evaluation of genotoxic effects of lead in pottery-glaze workers using micronucleus assay, alkaline comet assay and DNA diffusion assay
2013-04-25
This study investigated the genotoxic effects of occupational exposure to lead acetate in pottery-glaze ceramic workers. Thirty exposed workers and 30 matched controls were recruited for the study. Several biochemical parameters—the blood lead (B-Pb; range: exposed, 41.68-404.77; controls, 12-52) and cadmium (B-Cd) level, the activity of deltaaminolevulinic acid dehydratase (ALAD), erythrocyte protoporphyrin (EP), the level of vitamin B12 and folate in serum—were measured. The genotoxic effects were evaluated by the alkaline comet assay, the DNA diffusion assay and micronucleus test in peripheral blood lymphocytes. The results showed that subjects exposed to lead had significantly higher B-Pb...
level and, consequently, increased values of tail intensity (TI), frequency of apoptotic and necrotic cells, and frequency of micronuclei (MN). In contrast, their activity of ALAD, the level of vitamin B12 and folate in serum were significantly lower compared to controls. Poisson regression analysis demonstrated a significant correlation of profession, duration of exposure, smoking, level of cadmium in blood, ALAD and EP with primary DNA damage. A majority of primary damage repairs in a short period after exposure to a genotoxic agent. In addition, the influence of gender and level of vitamin B12 and folate in serum MN frequency in exposed group was observed. In this study, DNA diffusion and micronucleus test showed higher influence of tested parameters to DNA damage. The authors concluded that the findings from the present study indicate a need for concomitant use of at least two different biomarkers of exposure when estimating a genetic risk of lead exposure.

Authors: Kasuba, V.; Rozgaj, R.; Milic, M.; Zeljezic, D.; Kopjar, N.; Pizent, A.; Kljakovic-Gaspic, Z.; Jazbec, A.

Full Source: International Archives of Occupational and Environmental Health [online computer file] 2012, 85(7), 807-818 (Eng)

Quick management of accidental tritium exposure cases

2013-06-25

Removal half-life (RHL) of tritium is one of the best means for optimising medical treatment, reduction of committed ED (CED) and quick/easy handling of a large group of workers for medical treatment reference. The removal of tritium from the body depends on age, temperature, relative humidity and daily rainfall; so tritium removal rate, its follow-up and proper data analysis and recording are the best techniques for management of accidental acute tritium exposed cases. The decision of referring for medical treatment or medical intervention (MI) would be based on workers’ tritium RHL history taken from their bodies at the facilities. The workers with tritium intake up to 1 ALI shall not be considered for medical treatment as it is a derived limit of annual total ED. The short-term MI may be considered for tritium intake of 1-10 ALI; however, if the results show intake g100 ALI, extended strong medical/therapeutic intervention may be recommended based on the severity of exposure for maximum CED reduction requirements and annual total ED limit. The methodology is very useful for pressurised heavy water reactors (PHWRs), which are mainly operated by Canada and India and future fusion reactor technologies. The authors concluded that proper
The main objective of this study was to test the hypothesis that genetic variations in DNA repair genes may modify the association between occupational exposure to solvents and the risk of non-Hodgkin’s lymphoma (NHL). A population-based case-control study was conducted on Connecticut women including 518 histologically confirmed incident NHL cases and 597 controls. Unconditional logistic regression models were used to estimate the odds ratios and effect modification from the 30 single nucleotide polymorphisms in 16 DNA repair genes of the association between solvent exposure and the risk of NHL overall and subtypes. Single nucleotide polymorphisms in MGMT (rs12917) and NBS1 (rs1805794) significantly modified the association between exposure to chlorinated solvents and the risk of NHL (Pfor interaction) 0.0003 and 0.0048, respectively. After stratification by major NHL histology subtypes, MGMT (rs12917) modified the association between chlorinated solvents and the risk of diffuse large B-cell lymphoma (Pfor interaction) 0.0027 and follicular lymphoma (Pfor interaction) 0.0024. A significant interaction was also observed between occupational exposure to benzene and BRCA2 (rs144848) for NHL overall (Pfor interaction) 0.0042. The authors concluded that the findings from this study suggest that genetic variations in DNA repair genes modify the association between occupational exposure to solvents and the risk of NHL.
Technical

**An examination of blood lead levels in Thai nielloware workers**

2013-06-25

In this study, the authors measured the lead levels in blood samples from nielloware workers, to determine airborne lead levels. These results were then used to describe the workers’ hygiene behaviours, and to ascertain and describe any correlations between lead levels in blood samples and lead levels in airborne samples. Blood samples and airborne samples from 45 nielloware workers were collected from nielloware workplaces in Nakhon Sri Thammarat Province, Thailand. Lead levels were detected using flame atomic absorption spectrometry (FAAS), at a wavelength of 283.3nm. FAAS is adequate for metals at relatively high concentration levels. The geometric mean of the 45 airborne lead levels was 81.14 ìg/m³ (range 9.0-677.2 ìg/m³). The geometric mean blood lead level of the 45 workers was 16.25 ìg/dL (range 4.59-39.33 ìg/dL). No worker had a blood lead level > 60 ìg/dL. A statistically significantly positive correlation was found between airborne lead level and blood lead levels (r = 0.747, p < 0.01). It was observed that personal hygiene was poor; workers smoked and did not wash their hands before drinking or eating. The authors concluded that these behaviours had a significant correlation with blood lead levels (p < 0.001). Improvements in working conditions and occupational health education are required due to the correlation found between blood leads and airborne lead levels.

Authors: Decharat, Somsiri; Kongtip, Pornpimol; Thampoophasiam, Prapin; Thetkathuek, Anamai

Full Source: SH & W 2012, 3(3), 216-223 (Eng)

**Asbestos exposure among mitering workers**

2013-06-25

In this study, the authors compared the airborne asbestos concentrations resulting from mitering of asbestos cement roof sheets by a high-speed motor and a hand saw, and monitored whether other workers near the test sites where vulnerable to the fibres exceeding the occupational exposure limit. Four test cases were carried out and altogether 7 personal and 4 area air samples were collected. The NIOSH method 7400 was employed for the air samplings and analysis. Using the phase contrast microscopy, fibre counting was conducted under Rule A. The study showed that the fibre concentration medians for personal air samples gathered from the two tools were 4.11 fibres/cc (ranged: 1.33-12.41 fibres/cc) and 0.13 fibres/cc.
Human breast milk samples collected from mothers (n ) 110) who lived in Chengdu, Sichuan Province, southwestern China in 2009 were analysed to determine the concentrations of 13 musk compounds.

Possible relationships between musk concentrations and some personal characteristics were also studied. Only five target analytes were detected in the milk samples analysed, with median concentration values of 16.5, 11.5, 7.85, <1.5 and <1.4 ng g⁻¹ lipid weight for AHTN (7-acetyl-1,1,3,4,4,6-hexamethyl-1,2,3,4-tetrahydronaphthalene), HHCB (1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylcyclopenta[ç]-2-benzopyran), HHCB-lactone (1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylcyclopenta[ç]-2-benzopyran-1-one), OTNE ([1,2,3,4,5,6,7,8-octahydro-2,3,8-tetramethylnaphthalen-2yl]ethan-1-one) and musk ketone (4-tertbutyl-2,6-dimethyl-3,5-dinitroacetophenone, MK), respectively. Mothers who reported high use of hand-cleaning agents, body-cleaning agents, shampoo and hair conditioners, hair dyes and hair gels had significantly elevated milk concentrations of HHCB whereas elevated milk concentrations of AHTN were observed among mothers reporting high use of body-cleaning agents, body lotions, shampoos, hair dyes and hair gels. Younger age showed a significantly positive effect on milk concentrations of both HHCB and AHTN whereas BMI after delivery, the number of children nursed and place of residence (urban or rural) had no significant effect. The estimated median daily intakes of synthetic musks for breast-fed infants
were considerably lower than the current provisional tolerable daily intake amounts suggested for adults.

Authors: Yin, Jie; Wang, Hao; Zhang, Jing; Zhou, Naiyuan; Gao, Fudie; Wu, Yongning; Xiang, Jie; Shao, Bing

Full Source: Chemosphere [online computer file] 2012, 87(9), 1018-1023 (Eng)

PCBs and OH-PCBs in serum from children and mothers in urban and rural U.S. communities

2013-06-25

East Chicago, Indiana is a heavily industrialised community bisected by the Indiana Harbour and Ship Canal, which volatilises approximately 7.5 kg/yr polychlorinated biphenyls (PCBs). In contrast, the rural Columbus Junction, Iowa area has no known current or past PCB industrial sources. During the present study, the authors collected blood from children and their mothers from these communities from April 2008 to January 2009 (n = 177). Sera were analysed for all 209 PCBs and 4 hydroxylated PCBs (OH-PCBs). Sum PCBs ranged from nondetect to 658 ng/g lw (median) 33.5 ng/g lw. Sum OH-PCBs ranged from nondetect to 1.2 ng/g fw (median) 0.07 ng/g fw. These concentrations are similar to those reported in other populations without high dietary PCB intake. Differences between the two communities were subtle. PCBs were detected in more East Chicago mothers and children than Columbus Junction mothers and children, and children from East Chicago were enriched in lower-molecular weight PCBs. East Chicago and Columbus Junction residents had similar levels of total and individual PCBs and OH-PCBs in their blood. Concentrations of parent PCBs correlated with concentrations of OH-PCBs. This is the first temporally and methodologically consistent study to evaluate all 209 PCBs and major metabolites in two generations of people living in urban and rural areas of the United States.

Authors: Marek, Rachel F.; Thorne, Peter S.; Wang, Kai; DeWall, Jeanne; Hornbuckle, Keri C.

Full Source: Environmental Science & Technology [online computer file] 2013, 47(7), 3353-3361 (Eng)
Is Saliva a Potential Biomarker of Arsenic Exposure? A Case-Control Study in West Bengal, India

Saliva is a biological fluid that has not been used extensively as a biomonitoring tool in epidemiological studies. This study presents the arsenic (As) concentrations in saliva and urine samples collected from populations of West Bengal, India who had been previously exposed to high As levels in their drinking water. The authors found a significant association between the Log transformed Daily Ingestion of As (ig day-1) and the As concentration in saliva (r 0.68). In addition, As concentration of saliva and urine also had a significant positive correlation (r 0.60). Male participants, smokers, and cases of skin lesion were independently and significantly associated with an increase in salivary As. Thus the authors' findings show that saliva is a useful biomarker of As exposure in the study population. Furthermore, the study advocates that measurement of the forms of As in saliva may additionally provide insight into the internal dose and any individual differences in susceptibility to As exposure.

Authors: Bhowmick, Subhamoy; Halder, Dipti; Kundu, Amit kumar; Saha, Debasree; Iglesias, Monica; Nriagu, Jerome; Guha Mazumder, Debendra Nath; Roman-Ross, Gabriela; Chatterjee, Debashis

Full Source: Environmental Science & Technology [online computer file] 2013, 47(7), 3326-3332 (Eng)

New Insight into Biomarkers of Human Mercury Exposure Using Naturally Occurring Mercury Stable Isotopes

Human exposure to methylmercury (MeHg) and elemental mercury vapour (Hg0(g)) are often estimated using total Hg concentrations in hair and urine, respectively. In the present study, the authors investigated whether Hg stable isotopes could be used to better distinguish between exposure to Hg0(g) versus MeHg. The authors found that hair from North American dental professionals was characterised by high positive $^{199}$Hg values (mean 1.86‰, 1 SD 0.12‰). This confirms that among people who regularly consume fish, total Hg concentrations in hair reflect exposure to MeHg. In contrast, the authors found that urine from the same individuals was characterised by a range of $^{199}$Hg values (0.29 to 1.77‰, 2 SD 0.06‰) that were significantly correlated to the number of dental amalgams in each individual's mouth. The authors hypothesise that fish-
derived MeHg is demethylated within the body, causing mass-dependent fractionation and the excretion of inorganic Hg in urine. Mercury in urine therefore represents a mixture of demethylated fish-derived MeHg and amalgam-derived inorganic Hg. The authors estimate that the majority (>70%) of Hg in urine from individuals with <10 dental amalgams is derived from ingestion of MeHg in fish. The authors concluded that these findings suggest that within populations that consume fish, urine total Hg concentrations may overestimate Hg exposure from personal dental amalgams.

Authors: Sherman, Laura S.; Blum, Joel D.; Franzblau, Alfred; Basu, Niladri

Full Source: Environmental Science & Technology [online computer file] 2013, 47(7), 3403-3409 (Eng)

Reactive Oxygen Species Alteration of Immune Cells in Local Residents at an Electronic Waste Recycling Site in Northern China

In this study, the authors explored the association between oxidative stress and blood levels of e-waste related pollutants. Blood samples were collected from individuals living in the proximity of an e-waste recycling site located in northern China, and pollutants, as well as reactive oxygen species (ROS), were measured in comparison to a reference population. The geometric mean concentrations of PCBs, dechlorane plus, and 2,2',4,4',5,5'-hexabromobiphenyl in plasma from the exposure group were 60.4, 9.0, and 0.55 ng g⁻¹ lipid, respectively, which were 2.2, 3.2, and 2.2 times higher than the corresponding measurement in the reference group. Correspondingly, ROS levels in white blood cells, including in neutrophil granulocytes, from the exposure group were significantly higher than in those from the reference group, suggesting potential ROS related health effects for residents at the e-waste site. In contrast, fewer ROS were generated in the respiratory burst of neutrophil granulocytes for the exposure group, indicating a depressed innate immune function for the individuals living at the e-waste site. The authors concluded that these findings suggest a potential linkage between exposure to pollutants from...
Independent protection layers (IPLs) used to mitigate the most severe consequences are analysed for three chemical processes. The IPLs are categorised by type, function, and design. An analysis of management systems that are in place to ensure the integrity of the IPLs is also included. Categorisations for all three plants revealed similar results and suggest that the results extend across the chemical industry. The data show that the chemical plants depend much more heavily on IPLs that prevent an incident rather than respond to an incident once hazardous material is released. The survey also found that there is a significant reliance on administrative safeguards to achieve an acceptable level of risk. Recommendations are made on how administrative safeguards can adapt these systems to improve their robustness.

Authors: Meyer, Herbert W. H., III

Full Source: Process Safety Progress 2011, 30(4), 346-350 (Eng)
temperature in the samples were measured. A satisfactory agreement with the experiment data is achieved.

Authors: Holtappels, Kai; Beckmann-Kluge, Martin; Ferrero, Fabio; Schmidtchen, Ulrich

Full Source: Technische Sicherheit 2012, 2(4), 19-25 (Ger)

**Reduction of hazards from copper(I) chloride in a Cu-Cl thermochemical hydrogen production plant**

2013-06-25

The Cu-Cl cycle of thermochemical water splitting, using various heat sources, is a promising technology for H₂ production. The chemical hazards accompanying the new technology affect significantly the industrialisation of the cycle, but have scarcely been examined. This paper addresses this need by examining the CuCl hazards that may be generated in the cycle. Regardless of the variations of Cu-Cl cycle, CuCl is always present, serving as an intermediate compound that may cause health concerns. In this paper, the CuCl hazards are quantified for each process from the generation source of the hazards along with the paths where the CuCl may be present. The processes of greatest relevance include O₂ production, heat recovery, solidification, and dissolution. The options for reducing the CuCl hazards in a Cu-Cl thermochemical H₂ production plant are evaluated from the perspectives of variations of the Cu-Cl cycle, process integration, heat recovery, and equipment design. Using the intake reactant Cu₂OCl₂ for the O₂ production step to absorb CuCl vapour is the most preferable option compared with other alternatives such as absorbing CuCl vapour with water or CuCl₂, building additional structures inside the O₂ production reactor, and cooling the exiting gas at the outlet of the O₂ reactor.

Authors: Holtappels, Kai; Beckmann-Kluge, Martin; Ferrero, Fabio; Schmidtchen, Ulrich