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ENVIRONMENTAL

Problems, reasons and countermeasures for environmental quality and food safety in the overlapped areas of crop and mineral production
2010-04-30
This paper presented the concept of the overlapped areas of crop and mineral production based on data analysis, the overlapped areas between farmland and coal resource distribution are over 40% of total farmland in China. Of 13 key crop production provinces are also key coal production provinces. In the overlapped area, there are many problems such as environmental pollution, farmland damage, decrease of crop production, poor quality of crops, serious social conflicts and decrease of economic development. This paper discussed theses problems and presented some countermeasures and suggestions.
Authors: Hu, Zhenqi; Li, Jing; Zhao, Yanling
Full Source: Proceedings of the China Association for Science and Technology 2007 (Pub. 2008), 4(1), 932-936 (Eng)

Pollution of the atmosphere over Upper Amur region by mercury and associated elements and its effect on animals and human beings
2010-04-30
Low concentrations of Ca and Mg and elevated concentrations of Cd, Cr, Cs, K, Li, Mn, Na, Ni, Pb and Rb are recorded in the blood samples of people suffering from pulmonary diseases (tuberculosis) and stomach ulcer. The high concentration of mercury in humans is interpreted as being statistically significant shift of the trace element balance in people suffering from pulmonary tuberculosis.
Authors: Katola, V. M.; Radomskaya, V. I.; Radomskii, S. M.
Full Source: Ekologiya i Promyshlennost Rossii 2008, (May), 51-53 (Russ)

MEDICAL

Investigation of monocrotophos toxic effects on human lymphocytes at cytogenetic level
2010-04-30
The genotoxic and cytotoxic effects of monocrotophos, an organophosphate insecticide, was investigated on human lymphocytes cultured in vitro. Utilizing
In this study, cytotoxic and genotoxic effects of sodium hypochlorite were investigated by the cytokinesis-block micronucleus assay and chromosomal aberration analysis on human peripheral lymphocytes in vitro. A significant increase in chromosomal aberration frequency was observed in all treatments of NaOCl (0.030, 0.065, 0.100, 0.25, 0.5, 1, 2, 4 μg/mL) at 24 and 48 h compared with the negative control and mitomycin C (MMC, 0.3 μg/mL), which was used as a positive control. NaOCl significantly increased the frequency of micronuclei in a dose dependent manner.

Authors: Gul, Suleyman; Savsar, Asu; Tayfa, Zeynep
Full Source: Cytotechnology 2009, 59(2), 113-119 (Eng).

Genetic polymorphisms influence the susceptibility of men to sperm DNA damage associated with exposure to air pollution

Polymorphisms in metabolic genes (CYP1A1, EPHX1, GSTM1, GSTP1, GSTT1), folic acid metabolism genes (MTR, MTHFR), and DNA repair genes (XRCC1, XPD6, XPD23, hOGG1) were evaluated in these men as potential modifiers of associations between air pollution exposure and changes in sperm quality. The study population was a group of 47 policemen working in the centre of the city. Seasonal differences in exposure were verified by ambient and personal monitoring. Markers of sperm injury included semen vol., sperm concentration, sperm morphology, sperm motility, and sperm DNA damage measured with the sperm chromatin structure assay. The
sperm chromatin structure assay (SCSA) includes a measure of DNA damage called DNA Fragmentation Index (DFI). The % of cells with detectable DFI (detDFI) by this assay includes sperm with either medium or high DNA damage; the term hDFI is used to define the % of sperm with only high DNA damage. The assay also detects immature sperm defined by high d. staining (HDS). No significant differences were found in any of the std. semen parameters between the sampling periods except for vitality of sperms. Both DFI and HDS were significantly higher in winter than in spring samples for all men and for nonsmokers. At the bivariate level, significant associations between hDFI or detDFI and polymorphisms of the repair genes XRCC1, XPD6, and XPD23 were observed In multivariate models, polymorphisms of the genes XPD6, XPD23, and CYP1A1MspI were associated with hDFI and HDS. Moreover, HDS was significantly associated with polymorphisms in GSTM1 gene.

Authors: Rubes, J.; Rybar, R.; Prinosilova, P.; Veznik, Z.; Chvatalova, I.; Solansky, I.; Sram, R. J.
Full Source: Mutation Research, Fundamental and Molecular Mechanisms of Mutagenesis 2010, 683(1-2), 9-15 [Eng].

Metal Allergy - A Review on Exposures, Penetration, Genetics, Prevalence, and Clinical Implications 2010-04-30

The prevalence of metal allergy is high in the general population, and it is estimated that up to 17% of women and 3% of men are allergic to nickel and that 1-3% are allergic to cobalt and chromium. Among dermatitis patients, the prevalence of metal allergy is even higher. Metal allergy is mainly an environmental disorder although null mutations in the filaggrin gene complex were recently found to be associated with nickel allergy and dermatitis. Environmental metal exposures include jewellery, buttons, clothing fasteners, dental restorations, mobile phones, and leather. The epidemiology of metal allergy has recently changed in Europe as nickel allergy among ear-pierced Danish women has decreased following regulatory intervention on nickel release from consumer products. In the United States, the prevalence of nickel allergy is still increasing, which may be explained by the absence of regulation. The prevalence of chromium allergy is increasing in the United States, Singapore, and Denmark among dermatitis patients. This increase is significantly associated with leather exposure in Denmark. Metal allergy may result in allergic contact dermatitis and systemic allergic (contact) dermatitis.

Authors: Jacob P.; Menne, Torkil
Full Source: Chemical Research in Toxicology 2009, 23(2), 309-318 [Eng]
Multiple lines of evidence confirm the central role of 40-42 residue Aβ peptides in the pathogenesis of Alzheimer’s disease, but exact mechanisms of Aβ toxicity remain unclear. Recently, evidence has accumulated in favour of small oligomers of the Aβ42 peptide as major toxic species. Metal ions, copper(II) in particular, have been implicated in mol. mechanisms of Aβ neurotoxicity, including oxidative damage of lipid membranes. While monomeric Aβ peptides are not neurotoxic, the deep understanding of their chemical properties is prerequisite for significant progress in Alzheimer research. Monomeric Aβ40 and Aβ42 form a specific mononuclear complex with Cu- (II), recruiting donor atoms within their common 16 amino acid N-terminal sequence. The formation of this complex, the exact structure of which is debated, correlates with increased Aβ toxicity. Human serum albumin (HSA) is a versatile carrier protein present, among others, in blood and cerebrospinal fluid. It binds one Cu(II) ion with a high, picomolar affinity and one Aβ mol. with a moderate, micromolar affinity.

Authors: Rozga, Małgorzata; Bal, Wojciech
Full Source: Chemical Research in Toxicology 2009, 23(2), 298-308 (Eng).

MULTIPLE LINES OF EVIDENCE CONFIRM THE CENTRAL ROLE OF 40-42 RESIDUE Aβ PEPTIDES IN THE PATHOGENESIS OF ALZHEIMER’S DISEASE, BUT EXACT MECHANISMS OF Aβ TOXICITY REMAIN UNCLEAR. RECENTLY, EVIDENCE HAS ACCUMULATED IN FAVOUR OF SMALL Oligomers OF THE Aβ42 PEPTIDE AS MAJOR TOXIC SPECIES.
Pre-evaluation of occupational hazards in an iron and steel enterprise
2010-05-05
In this study, the authors evaluated the occupational hazards in an iron and steel enterprise in order to detect the preventive effect of a sanitation preventing method. The evaluation index of the program was 0.61. The hydrogen fluoride concentration in anneal workshop operation room and anneal workshop pickling project was 0.07-0.13 and 0.14-0.29 respectively. The author concluded that based on the findings, the program further strengthened and prevented occupational hazards, which is useful in protecting the health of workers.
Author: Bi, Yuandui
Full Source: Zhiye Yu Jiankang 2008, 24(23), 2582-2583 (Ch)

Observation on levels of mAlb, NAG, r1-MG in urine of asphalt-melting workers
2010-05-05
In this study, the authors measured the levels of urinary microalbumin (mAlb), N-acetyl-â-D-glucosaminidase (NAG) and R1-microglobulin (R1-MG) in urine of asphalt-melting workers. In addition, 47 healthy people underwent the same analysis as the control subjects. The results demonstrated that the levels of mAlb and R1-MG in asphalt-melting workers were higher than that in the controls, and the difference had statistical significance. The levels of R1-MG, NAG and mAlb were positively related with working age (P<0.01). In addition, mAlb was positively correlated with R1-MG (P<0.01). The authors concluded that these results suggested that long-time asphalt-melting had influence on renal function of workers.
Authors: Liu, Yinyin; Guo, Xiangyun; Qi, Famei; Zhang, Xingwang
Full Source: Zhongguo Gongye Yixue Zazhi 2008, 21(6), 387-388 (Ch)

Effects of TDI on workers’ health
2010-05-05
This study investigated the effects of toluene diisocyanate (TDI) on the health of exposed workers. A factory was investigated with the method of industrial hygiene, and workers underwent physical examination. The results of investigation and physical examination were analysed and the authors observed a significant correlation between the concentration of TDI in plant and respiratory symptoms of the exposed workers. The incidence of headache, dizziness, chest stuffy, short of breath, eye pain, tears and pruritus of the workers was significantly higher than in the control group.

In this study, the authors evaluated the occupational hazards in an iron and steel enterprise in order to detect the preventive effect of a sanitation preventing method.
In conclusion, the authors suggested that TDI had certain influences on exposed worker’s health. The most serious damages of TDI occurred in the respiratory system, nervous system and eyes. The product-packaging workshop was the critical control point of occupational hazard.

Authors: Cui, Guorong; Zhao, Ming; Dong, Huiping
Full Source: Zhiye Yu Jiankang 2008, 24(13), 1243-1244 (Ch)

Analysis on SOD activity and MDA content in workers exposed to styrene
2010-05-05
This study examined the activity of superoxide dismutase (SOD) and level of malondialdehyde (MDA) in workers exposed to styrene. Twenty-five workers who were not exposed to styrene were recruited as the controls. The results indicated that those workers exposed to styrene had a decrease in the activity of SOD and increase in MDA level when compared with the control group. The authors concluded that these results suggest that toxicity of styrene might be related to lipid peroxidation.

Authors: Jin, Huanrong; Zhao, Su; Wang, Hong; Yang, Yankai
Full Source: Zhongguo Gongye Yixue Zazhi 2008, 21(6), 389-390 (Ch)

Pre-evaluation of the occupational hazards in enlarge construction project of microwave hybrid integrate circuit production line
2010-05-05
The objective of this study was to identify the occupation hazard factor in the microwave hybrid integrate circuit production line, and evaluate the rationality of occupation hazard defending measure. The project was pre-evaluated by analogy analysis and experience. The forecast suggested the intensity of locale occupation hazard factors, including silica dust, lead-bearing flue ash, toluene, acetone, hydrochloric acid, sulphuric acid, nitrogen dioxide, noise, etc., could achieve the national occupation sanitation standard. In conclusion, the project had serious occupation hazard. The author concluded that if occupation hazard defending measure could be carried out carefully, it would be feasible.

Author: Xu, Yuexia
Full Source: Zhiye Yu Jiankang 2008, 24(13), 1313-1314 (Ch)
Hygiene evaluation of the health risk for residents of Ufa city exposed to the effect of heavy metals
2010-05-05
In this study, the authors evaluated the effect of metals consumed by residents of the major industrial city of Ufa (Russia). Studies show that in the absence of occupational exposure contact to salts of heavy metals, human health becomes more susceptible to ecological influence. The main source of heavy metal intake by humans includes foods constituting g 90% of the daily dose of the metals. Increased levels of lead, chromium, and nickel and lower levels of zinc in biological systems of Ufa residents can be attributed to the type and degree of contamination of foods consumed.
Authors: Larionova, T. K.; Garifullina, G. F.
Full Source: Meditsina Truda i Promyshlennaya Ekologiya 2008, (5), 11-14 (Russ)

Phenotypes of individuals affected by airborne chemicals in the general population
2010-05-05
This study characterised the chemical exposures and symptoms affecting individuals with subsequent adjustments of social life or occupational conditions, and further characterised these severely affected individuals. All individuals (n =1,134) who reported symptoms from airborne chemical exposures in a population-based questionnaire study of 6,000 individuals were included and dichotomised according to severity. Logistic regression models were used to characterise the group of severely affected individuals. Severely affected individuals reported more symptoms and exposures related to symptoms than less severely affected individuals, and the number of symptoms was more predictive for severity than the number of exposures. Most predictive for the severity of reported symptoms were CNS-symptoms other than headache (OR = 3.2, P< 0.001) and exposure to freshly printed papers or magazines (OR =2.0, P = 0.001). The authors concluded that the findings suggest that CNS-symptoms except from headache were a main characteristic of individuals severely affected by common chemical exposures in a general population-based sample.
Authors: Berg, Nikolaj Drimer; Linneberg, Allan; Dirksen, Asger; Elberling, Jesper
Full Source: International Archives of Occupational and Environmental Health 2009, 82(4), 509-517 (Eng)
Environmental endocrine disruptors and abnormal sexual development in children

Children are extensively exposed to pollution of environmental endocrine disruptors (EEDs) and it is well-known that there is a close relationship between EEDs and the onset of abnormal sexual development. This should attract sufficient attention of government, to improve the policies for related industries and for environmental protection as soon as possible, and put an end to the environmental pollution caused by these harmful materials. In addition, effective preventive and therapeutic interventions with medicines appropriate to the situation should be formulated. It has been verified that Chinese herbal medicine (CHM) could effectively counteract the oestrogen-like activity of EEDs. This was achieved via regulaive effects on oestrogen receptors, oestrogen synthetase and growth factors in the target organs.

Author: Cai, Depei
Full Source: Linchuang Erke Zazhi 2008, 26(12), 1007-1009 (Ch)

Evaluation of physiological measures for correcting variation in urinary output: Implications for assessing environmental chemical exposure in children

Urinary contaminant concentrations are commonly adjusted by creatinine to account for the variability in urinary output. This approach may not be optimal among children due to developmental growth of muscle mass and the associated increase in creatinine formation. An alternative approach is to measure the specific gravity of the urine sample, which reflects the solute concentration of the urine. In this study, the authors compared the appropriateness of urinary creatinine and urinary-specific gravity as factors for correcting morning and evening spot urine samples collected from 23 children (3-11 years) for a total of 41 days in four different seasons. Two linear mixed-effects models were fit using age, sex, season, and sample collection time (morning/evening) as predictors with specific gravity and creatinine as dependent variables. The results indicated that specific gravity was significantly associated with the sample collection time (P < 0.001) with morning samples higher than evening samples. In addition, creatinine was significantly associated with season (P < 0.05), sample collection time (P < 0.0001), and age (P <0.0001). Creatinine levels were higher during the summer compared to the other seasons, higher in the morning compared to the evening, and higher with increases in children’s age. The authors concluded that normalising the children’s spot urine samples using creatinine
would introduce bias to the data analysis. Whereas using specific gravity to correct for variable urinary output would be more robust. Furthermore, measuring specific gravity is relatively easy, does not require the use of chemicals, and the results are available instantaneously.

Authors: Pearson, Melanie A.; Lu, Chensheng; Schmotzer, Brian J.; Waller, Lance A.; Riederer, Anne M.

Source apportioning and molecular characterisation of incomplete combustion products in PM1.1 and PM10 aerosols from residential areas of suburban Tokyo using natural abundance radiocarbon

Incomplete combustion generates polycyclic aromatic hydrocarbons (PAHs) and black carbon (BC), two of the most important classes of pollutants to the atmospheric environment. Radiocarbon (14C) is an ideal tracer to distinguish between fossil fuel (14C-free) from modern biomass combustion sources (101 pMC of atm. 14CO2 in 2004) of pyrogenic products. In a previous study, the authors found that 14C content (in terms of percent modern carbon: pMC) of PAHs in PM10 aerosols from suburban Tokyo (45 and 33% pMC in summer and winter, respectively) is far exceeding the statistic-based expectations (~3%). In the present study, the authors tested the same set of samples, investigating 14C content of BC and TOC and the temporal variations of molecule markers from biomass burning (e.g., levoglucosan:LG2). The results demonstrated that the 14C-BC signals, 42 and 30% pMC in summer and winter aerosols, were significantly higher than those reported for the urban particulate matter from Washington DC (SRM1649a) but almost identical to those of high molecular weight (MWg226) PAHs in the same set of aerosol samples. In addition, 14C-TOC, 62% and 42% pMC in summer and winter, respectively, shows highest values compared with 14C-PAHs and 14C-BC results, suggesting higher contribution of plant activity in summer. However, it was significant low compared with modern carbon source from atmospheric 14CO2.

Full Source: Organohalogen Compounds [computer optical disk] 2007, 69, 744/1-744/3 [Eng]
Inherent risk assessment - a new concept to evaluate risk in preliminary design stage
2010-04-30
This paper proposes a new concept to evaluate risk inherent to a process owing to the chemical it uses and the process conditions. The risk assessment tool is integrated with process design simulator (HYSYS) to provide necessary process data as early as the initial design stages, where modifications based on inherent safety principles can still be incorporated to enhance the process safety of the plant. The risk assessment tool consists of two components which calc. the probability and the consequences relating to possible risk due to major accidents. A case study on the potential explosion due to the release of flammable material demonstrates that the tool is capable to identify potential high risk of process streams. Further improvement of the process design is possible by applying inherent safety principles to make the process under consideration inherently safer. Since this tool is fully integrated with HYSYS, re-evaluation of the inherent risk takes very little time and effort.
Authors: Shariff, Azmi Mohd; Leong, Chan T.
Full Source: Process Safety and Environmental Protection 2009, 87(6), 371-376 (Eng)

Provisional Advisory Levels (PALs) for phosgene (CG)
2010-04-30
The Provisional Advisory Level (PAL) protocol was applied to established inhalation exposure limits for phosgene (CG). Three levels (PAL 1, PAL 2, and PAL 3), distinguished by severity of toxic effects, are developed for 24-h, 30-day, 90-day, and 2-yr durations of potential drinking water and inhalation exposures for the general public. Data on humans are limited to occupational exposures or accounts from the use of phosgene as a chemical warfare agent in World War I. Animal studies with phosgene show a steep dose-response curve for pulmonary oedema and mortality, with little species variability in effects. Although immediately upon exposure lacrimation and upper respiratory irritation can occur, the main effect in the target organ, a progressive pulmonary oedema, occurs after a latency period of 1-24 h. PAL estimates were approved by the Expert Consultation Panel for Provisional Advisory Levels in May 2007. Exposure limits for oral exposure to CG are not developed due to insufficient data. PAL estimates for inhalation exposure to CG are presented: The 24-h PAL values for severity levels 1, 2, and 3 are 0.0017, 0.0033 and 0.022 ppm, repetitively. The
30- and 90-day PAL values are 0.0006 and 0.0012 ppm for the PAL 1 and 2 values, respectively. These inhalation values were also accepted as the 2-yr PAL 1 and 2 values because severity of lesions in the key study did not increase when exposures were extended from 4 wk to 12 wk.

Authors: Glass, Dana; McClanahan, Mark; Koller, Loren; Adeshina, Femi
Full Source: Inhalation Toxicology 2009, 21(Suppl. 3), 73-94 [Eng]

**Risk assessment of carcinogens in food**

2010-04-30

This review describes the evolution of risk assessment advice on carcinogens and discusses examples of ways in which carcinogens in food have been assessed in Europe.

Authors: Barlow, Susan; Schlatter, Josef
Full Source: Toxicology and Applied Pharmacology 2010, 243(2), 180-190 [Eng]