Contents

[click on page numbers for links]

**ENVIRONMENTAL**

Effects of disease control by fungicides on greenhouse gas emissions by UK arable crop production ................................................................. 3
Application of health risk assessment method for geological environment at national and regional scales ................................................................. 3

**MEDICAL**

Polycyclic aromatic hydrocarbons impair function of α2-adrenergic receptors in airway epithelial and smooth muscle cells ........................................... 4
Halogenated Phenolic Contaminants Inhibit the In Vitro Activity of the Thyroid-Regulating Deiodinases in Human Liver ........................................ 5
Activation of 4-aminobiphenyl mediated by 5-lipoxygenase and DNA damage in human bronchial epithelial cells ........................................................................... 6
Nano-silicon dioxide toxicological characterisation on two human kidney cell lines ......................................................................................................................... 7
Aldo-Keto Reductases Protect Lung Adenocarcinoma Cells from the Acute Toxicity of B[a]P-7,8-trans-Dihydrodiol ................................................................ 7

**OCCUPATIONAL**

Pulmonary function and oxidative stress in workers exposed to styrene in plastic factory: occupational hazards in Styrene-exposed plastic factory workers stress in occupationally exposed workers in plastic factory ................................................................................................................................. 8
Levels of toxic chemical elements in organisms of state fire-fighting service employees .......................................................................................... 9
Exposure to Flame Retardants in Electronics Recycling Sites ................. 10
Validity and Reliability of Exposure Assessors’ Ratings of Exposure Intensity by Type of Occupational Questionnaire and Type of Rater ............... 10
Determinants of Captan Air and Dermal Exposures among Orchard Pesticide Applicators in the Agricultural Health Study ....................................... 12

**PUBLIC HEALTH**

Dioxin exposure and cancer risk in the Seveso Women’s Health Study. “w2012-02-28 ....................................................................................................... 13
In which regions is breast-feeding safer from the impact of toxic elements from the environment? ................................................................. 14
Use of hair mineral analysis in the assessment of orthodontic patients’ exposure to metals .............................................................................. 14
Contents

Assessment of reference ranges for blood Cu, Mn, Se and Zn in a selected Italian population................................................................................................................15
Environmental and social intervention strategies in lead exposure in children.................................................................................................................................15

SAFETY
Drilling slag discharging dust remover for underground coal mine........... 16
Online diagnosis device for exhaust purifier of diesel engine...................... 17
Integrative air purification and refrigeration apparatus used in underground refuge or rescue capsule of coal mine......................................................... 17
The UK government has published plans to reduce the country’s agricultural greenhouse gas (GHG) emissions. At the same time, the goal of global food security requires an increase in arable crop yields. Foliar disease control measures such as fungicides have an important role in meeting both objectives. The results indicated that UK winter barley production is associated with GHG emissions of 2770 kg CO$_2$ equivalent ha$^{-1}$ of crop and 355 kg CO$_2$ equivalent one tone of grain. Foliar disease control by fungicides is associated with decreases in GHG emissions of 42-80 kg CO$_2$ equivalent 1 tone in UK winter barley and 29-39 kg CO$_2$ equivalent 1 tone in UK spring barley. The sensitivity of these results to the impact of disease control on yield and to variant GHG emissions assumptions is presented. Fungicide treatment of the major UK arable crops is estimated to have directly decreased UK GHG emissions by over 1.5 Mt CO$_2$ equivalents in 2009. The authors concluded that crop disease control measures such as fungicide treatment reduce the GHG emissions associated with producing a tonne of grain. As national demand for food increases, greater yields as a result of disease control also decrease the need to convert land from non-arable to arable use, which further mitigates GHG emissions.

Authors: Hughes David J.; West Jonathan S.; Atkins Simon D.; Gladders Peter; Jeger Michael J.; Fitt Bruce D. L.

Full Source: Pest Management Science 2011, 67(9), 1082- 1092 (Eng)

Application of health risk assessment method for geological environment at national and regional scales

Health risk (defined as possible or probable human health damage, illness, or death due to exposure to environmental risk factors) was derived for a geological environment (soil) and estimated at a national scale for all of Europe and at more detailed regional scale for the Slovak Republic. This assessment was based on data obtained from international geochemical mapping of Europe and the national geochemical mapping program of the Slovak Republic. Chemical elements evaluated were B, Ba, Be, Cd, Cu, F, Hg, Mn, Mo, Ni, Pb, Sb, Se, and Zn. The health risk assessment method was based on calculated average daily doses of individual
elements analysed in every soil sample. Exposure levels were set using exposure parameters and reference doses from integrated US EPA databases. Calculated results were transformed into various maps (dot, pixel) to delineate areas where increased content of risk elements pose a risk to human health. European mapping results indicated increased concentrations of potentially toxic elements in soil (As, Pb, Ni) occur primarily in southern and western European countries. Such elements were associated with increased health risk for the resident population. For northern European countries, the health risk was estimated at a significantly lower level. The increased health risk level was observed in areas well known for high soil pollution (e.g. mining areas).

Authors: Rapant S.; Fajcikova K.; Khun M.; Cveckova V.
Full Source: Environmental Earth Sciences [online computer file] 2011, 64(2), 513-521 (Eng)

MEDICAL

Polycyclic aromatic hydrocarbons impair function of $\beta_2$-adrenergic receptors in airway epithelial and smooth muscle cells

2012-02-27
Incomplete combustion produces a pollutant mixture that includes polycyclic aromatic Hydrocarbons (PAHs). Previous work by the Columbia centre for Children's Environmental Health (CCCEH) and others linked exposure to PAH with symptoms of asthma and other adverse health effects in young children. Inhaled $\beta_2$-adrenergic agonists are mainstays in the treatment of reactive airway diseases. These exogenous catecholamines engage membrane-bound $\beta_2$-adrenergic receptors ($\beta_2$AR) on airway epithelial and smooth muscle cells to cause airway dilation. The author hypothesised that exposure to PAH might similarly interfere with the function of $\beta_2$AR in airway epithelial or smooth muscle cells, reducing the efficacy of a medication important for the treatment of asthma symptoms. A PAH mixture was devised, based on ambient levels measured prenatally among a cohort of pregnant women participating at the CCCEH. Primary airway epithelial and smooth muscle cells were exposed to varying concentrations of the PAH mixture and expression, function, and signalling of $\beta_2$AR were assessed. Murine tracheal epithelial cells and human airway smooth muscle cells, after exposure to a PAH mixture exhibited reduced expression and function of $\beta_2$AR. These findings support the authors’ hypothesis that environmentally relevant PAHs can impede $\beta_2$AR-mediated...
Halogenated Phenolic Contaminants Inhibit the In Vitro Activity of the Thyroid-Regulating Deiodinases in Human Liver

2012-02-27

Halogenated contaminants, particularly brominated flame retardants, disrupt circulating levels of thyroid hormones (THs) and potentially affecting growth and development. Disruption may be mediated by impacts on deiodinase (DI) activity, which regulate the levels of active hormones available to bind to nuclear receptors. The goal of this study was to develop a mass spectrometry-based method for measuring the activity of DI in human liver microsomes and to examine the effect of halogenated phenolic contaminants on DI activity. Thyroxine (T4) and reverse triiodothyronine (rT3) deiodination kinetics were measured by incubating pooled human liver microsomes with T4 or rT3 and monitoring the production of T3, rT3, 3,3'-diiodothyronine, and 3-monoiodothyronine by liquid chromatography tandem mass spectrometry. Using this method, the authors examined the effects of several halogenated contaminants, including 2,2',4,4',5-pentabromodiphenyl ether (BDE 99), several hydroxylated polybrominated di-Ph ethers (OH-BDEs), tribromophenol, tetrabromobisphenol A, and triclosan, on DI activity. The Michaelis constant (Km) of rT3 and T4 deiodination were determined to be 3.2 and 17.3 nM. The Vmax was 160 and 2.8 pmol/min mg protein, respectively. All studied contaminants inhibited DI activity in a dose response manner, with the exception of BDE 99 and two OH-BDEs. 5'-Hydroxy 2,2',4,4',5-pentabromodiphenyl ether was found to be the most potent inhibitor of DI activity, and phenolic structures containing iodine were generally more potent inhibitors of DI activity relative to brominated, chlorinated, and fluorinated analogues. This study suggests that some halogenated phenolics, including current use compounds such as plastic
monomers, flame retardants, and their metabolites, may disrupt TH homeostasis through the inhibition of DI activity in vivo.

Authors: Butt, Craig M.; Wang, Dongli; Stapleton, Heather M.
Full Source: Toxicological Sciences [online computer file] 2011, 124(2), 339-347 (Eng)

Activation of 4-aminobiphenyl mediated by 5-lipoxygenase and DNA damage in human bronchial epithelial cells
2012-02-27
The effect of 4-aminobiphenyl (4-ABP) on 5-lipoxygenase (5-LOX) protein expression, cytotoxicity, and DNA damage in human bronchial epithelial (HBE) cells was studied to provide evidence that LOX is a pathway for oxidation and activation of pre-carcinogens.

1. Enzymic experiment: soybean lipoxygenase (SLO), substrate (4-ABP) and other components reacted in an enzymic system; the product was detected with spectrophotometry.
2. Cellular experiment: the effect of 4-ABP on the cellular survival rate was assessed by reduction of tetrazolium dye (MTT) in cultured HBE cells. After HBE cells were exposed to 4-ABP 100-800 M for 4 h, the protein expression of 5-LOX in HEB cells was tested by Western blotting, and DNA damage by single cell gel electrophoresis.
3. Finally the effect of specific inhibitors of 5-LOX, AA861, on 5-LOX protein expression and DNA damage in the cells was detected.

The authors found that SLO catalysed the co-oxidation of 4-ABP in the presence of H2O2. Nordihydroguaiaretic acid (NDGA) inhibited the oxidation of 4-ABP by SLO, seemingly in a concentration dependent manner and with in a special range. 4-ABP induced 5-LOX protein expression, but AA861 was invalid in HBE. 4-ABP caused toxic action and DNA damage in HBE, as the pos. rate comet cells was increased to 47.7% by 4-ABP at 400 M. Such damage could be significantly inhibited by AA861 and naproxen with a maximum rate of protection of 58.1% and 21.7%, respectively. 4-ABP can regulate 5-LOX protein expression in HBE cells. The co-oxidation of 4-ABP with 5-LOX could induce DNA damage, which could be one of the mechanisms for carcinogenesis of 4-ABP.

Authors: Zhu, Hongxiang; Hu, Jianan; Huang, Yun; Wu, Yue; Xiong, Minru
Full Source: Zhongguo Yaolixue Yu Dulixue Zazhin 2011, 25(2), 193-200 (Ch)
Nano-silicon dioxide toxicological characterisation on two human kidney cell lines
2012-02-27
Silicon dioxide nano-particles (n-SiO2) have recently encountered a wide variety of applications in medicine or engineering but their toxicology effects are poorly understood. In this study, SiO2-25 nm and SiO2-100 nm mono-dispersed nano-particles were used and labelled with Rhodamine B and TMPyP respectively. These two fluorophores were incorporated during synthesis in order to track nano-particles cell incorporation. Upto-date, no evaluation of the toxicology effects of these nano-particles upon human kidney has been published. The aim of this study is to evaluate the potential toxicity of these nano-particles on two human cell lines from proximal tubule (Caki-1 and Hek293). The results report that the two cell lines do not show similar responses after 24 h of exposure to SiO2-nanoparticles disregarding a similar origin in the kidney. These results indicate that for both tested SiO2-nano-particles, caki-1 cells present a higher sensitivity in terms of cytotoxicity and genotoxicity than Hek293 cells. Also, the results show that for similar concentration of exposure, SiO2-25 nm seems to be more cytotoxic and genotoxic than SiO2-100nm for both tested cell lines.
Authors: Paget, V.; Sergent, J. A.; Chevillard, S.
Full Source: Journal of Physics: Conference Series [online computer file] 2011, 304, 012080/1-012080/10 (Eng)

Aldo-Keto Reductases Protect Lung Adenocarcinoma Cells from the Acute Toxicity of B[a]P-7,8-trans-Dihydrodiol
2012-02-28
Tobacco smoke exposure stimulates the expression of genes that are likely to be involved in the metabolism of its combustion products such as polycyclic aromatic hydrocarbons (PAH). These data suggest that over expression of aldo-keto reductases may protect lung cancer cells from the acute toxic effects of PAH. Four of the smoke induced genes are aldo-keto reductases (AKR), enzymes that metabolically activate PAH to PAH o-quinoones. Alternatively, PAHs are metabolised to anti-diol epoxides, such as antibenzo a]pyrene diol epoxides -anti-BPDE, by the combined action of P 4501A1/1B1 and epoxide hydrolase. Anti-BPDE forms DNA adducts directly, while PAH o-quinoones cause DNA damage by oxidative stress through a futile redox cycle. To address the role of AKRs in PAH cytotoxicity, the authors compared the cytotoxicity of PAH metabolites and the effects of over expressing AKR1A1 in lung cells. Anti-BPDE and
The aim of the present study was to investigate the effect of styrene on lung function and oxidative stress in occupationally exposed workers in plastic factory.

2012-02-28

Styrene is a volatile organic compound used in factories for synthesis of plastic products. The pneumotoxicity of styrene in experimental animals is known. The aim of the present study was to investigate the effect of styrene on lung function and oxidative stress in occupationally exposed workers in plastic factory. Thirty-four male workers, between 18 and 40 years of age, exposed to styrene for at least 8 hours a day for more than a year were studied, while 30 age- and sex-matched healthy subjects not exposed to styrene served as controls. Assessment of lung functions showed a statistically significant reduction (p < 0.05) in most of the lung volumes, capacities (FVC, FEV1, VC, ERV, IRV, and IC) and flow rates (PEFR, MEF75%, and MVV) in the study group (workers) as compared to controls. Malondialdehyde (MDA) was observed to be significantly high (p < 0.05)
while ferric-reducing ability of plasma (FRAP) was significantly low \((p < 0.05)\) in styrene-exposed subjects. Reduced glutathione (GSH) level was significantly depleted in exposed subjects as compared to control group. The mean value of serum cytochrome c in styrene-exposed subjects was found to be 1.1 ng/mL \((0.89-1.89)\) while in control its levels were under detection limit \((0.05 \text{ ng/mL})\). The authors concluded that the findings from this study showed that styrene inhalation by workers leads to increased level of oxidative stress, which is supposed to be the cause of lung damage.

Authors: Sati, Prakash Chandra; Khaliq, Farah; Vaney, Neelam; Ahmed, Tanzeel; Tripathi, Ashok K.; Banerjee, Basu Dev
Full Source: Human & Experimental Toxicology 2011, 30(11), 1743-1750 (English)

Levels of toxic chemical elements in organisms of state fire-fighting service employees

2012-02-28
In this study, the authors undertook an analysis of the concentration of toxicant chemical elements in fire-fighters in Saint-Petersburg. Ninety men working at the State Fire-Fighting Service (SFFS) and residing in Saint-Petersburg and Leningrad Region were examined. Apparently healthy men (34 people) who are not subjected to negative occupational influences were examined as a control group. The analysis of chemical composition of hair and blood serum samples were carried out to estimate the concentration of toxicant bioelements in the subjects. The concentration level of macro and microelements in bioprobes was detected using method of mass spectrometry on quadrupole mass analyser (X-SERIES II ICP-MS) with inductively coupled argon plasma according to methodical instructions. The results demonstrated higher concentrations of aluminium, cadmium and plumbum in the hair and blood serum samples of the fire-fighters compared to the control group, thus there exists an accumulation of toxicant elements in SFFS personnel. The authors concluded that based on the findings from this study, preventive and treatment measures should be considered to ensure a high work capacity and occupational health of SFFS personnel.

Authors: Shantyr, I. I.; Vlasenko, M. A.; Yakovleva, M. V.; Ushal, I. E.; Kharlamychev, E. M.
Full Source: Voprosy Biologicheskoi, Meditsinskoi I Farmatsevticheskoi Khimii 2011, (9), 56-59 (Russian)
Technical

Exposure to Flame Retardants in Electronics Recycling Sites
2012-02-28
Waste electrical and electronic equipment (WEEE) contains various hazardous substances such as flame retardants (FRs). Inhalation exposures to many FRs simultaneously among WEEE recycling site workers have been little studied previously. The breathing zone airborne concentrations of five brominated FR compounds tetrabromobisphenol-A (TBBP-A), decabromodiphenylethane (DBDPE), hexabromocyclododocane, 1,2-bis(2,4,6-tribromophenoxy)ethane, hexabromobenzene, and one chlorinated FR (Dechlorane Plus) were measured at four electronics recycling sites in two consecutive years. In addition, concentrations of polybrominated di-Ph ethers (pBDEs) and polybrominated biphenyls were measured. The three most abundant FRs in personal air samples were pBDEs (comprising mostly of deca-BDE), TBBP-A, and DBDPE, with mean concentrations ranging from 21 to 2320 ng m-3, from 8.7 to 430 ng m-3, and from 3.5 to 360 ng m-3, respectively. At two of the sites, the emission control actions (such as improvements in ventilation and its maintenance and changes in cleaning habits) proved successful, the mean levels of FRs in personal samples being 10-68 and 14-79% of those from the previous year or alternatively below the limit of quantification. At the two remaining sites, the reductions in FR exposures were less consistent. The concentrations reported may pose a health hazard to the workers, although evaluation of the association between FR exposure and adverse health effects is hampered by lacking occupational exposure limits. The authors concluded that based on the findings, the exposures should be minimised by adequate control measures and maintaining good occupational hygiene practice.
Authors: Rosenberg, Christina; Haemela, Mervi; Tornaeus, Jarkko; Saekkinen, Katriina; Puttonen, Katriina; Korpi, Anne; Kiilunen, Mirja; Linnainmaa, Markku; Hesso, Antti
Full Source: Annals of Occupational Hygiene 2011, 55(6), 658-665 (Eng)

Validity and Reliability of Exposure Assessors’ Ratings of Exposure Intensity by Type of Occupational Questionnaire and Type of Rater
2012-02-28
In epidemiological studies that rely on professional judgment to assess occupational exposures, the raters’ accurate assessment is vital to detect associations. During the present study, the authors examined the influence of the type of questionnaire, type of industry, and type of rater on the raters’ ability to reliably and validly assess within-industry differences in exposure.
of the type of questionnaire, type of industry, and type of rater on the raters’ ability to reliably and validly assess within-industry differences in exposure. The aim of the study was to identify areas where improvements in exposure assessment may be possible. Subjects from three foundries (n = 72) and three textile plants (n = 74) in Shanghai, China, completed an occupational history (OH) and an industry-specific questionnaire (IQ). Six total dust measurements were collected per subject and were used to calculate a subject-specific measurement mean, which was used as the gold standard. Six raters independently ranked the intensity of each subject’s current job on an ordinal scale (1-4) based on the OH alone and on the OH and IQ together. Aggregate ratings were calculated for the group, for industrial hygienists, and for occupational physicians. The authors calculated intra-class correlation coefficients (ICCs) to evaluate the reliability of the raters. The correlation between the subject specific measurement means and the ratings were calculated to evaluate the raters’ validity. Analyses were stratified by industry, type of questionnaire, and type of rater. In addition, the agreement between the ratings by exposure category, where the subject-specific measurement means were categorised into two and four categories were evaluated. The reliability and validity measures were higher for the aggregate ratings than for the ratings from the individual raters. The group’s performance was maximised with three raters. Both the reliability and validity measures were higher for the foundry industry than for the textile industry. The ICCs were consistently lower in the OH/IQ round than in the OH round in both industries. In contrast, the correlations with the measurement means were higher in the OH/IQ round than in the OH round for the foundry industry (group rating, OH/IQ: Spearman rho = 0.77; OH: rho = 0.64). No pattern by questionnaire type was observed for the textile industry (group rating, Spearman rho = 0.50, both assessment rounds).

For both industries, the agreement by exposure category was higher when the task was reduced to discriminating between two vs. four exposure categories. Assessments based on professional judgment may reduce misclassification by using two or three raters, by using questionnaires that systematically collect task information, and by defining intensity categories that are distinguishable by the raters. However, few studies have the resources to use multiple raters and these additional efforts may not be adequate for obtaining valid subjective ratings. The authors concluded that considering this, improving exposure assessment approaches for studies that rely on professional judgment remain an important research need.

Authors: Friesen, Melissa C; Coble, Joseph B; Katki, Hormuzd A; Ji, Buitian; Xue, Shouzheng; Lu, Wei; Stewart, Patricia A.
Full Source: Annals of Occupational Hygiene 2011, 55(6), 601-611 (Eng)
Determinants of Captan Air and Dermal Exposures among Orchard Pesticide Applicators in the Agricultural Health Study

This study identified and quantified determinants of captan exposure among 74 private orchard pesticide applicators in the Agricultural Health Study (AHS). To adjust an algorithm used for estimating pesticide exposure intensity in the AHS based on these determinants and to compare the correlation of the adjusted and unadjusted algorithms with urinary captan metabolite levels. External exposure metrics included personal air, hand rinse, and dermal patch samples collected from each applicator on 2 days in 2002-2003. A 24-h urine sample was also collected. Exposure determinants were identified for each external metric using multiple linear regression models via the NLMIXED procedure in SAS. The AHS algorithm was adjusted, consistent with the identified determinants. Mixed-effect models were used to evaluate the correlation between the adjusted and unadjusted algorithm and urinary captan metabolite levels. Consistent determinants of captan exposure were a measure of application size (kilogram of captan sprayed or application method), wearing chemical-resistant (CR) gloves and/or a coverall/suit, repairing spray equipment, and product formulation. Application by airblast was associated with a 4- to 5-fold increase in exposure as compared to hand spray. Exposure reduction to the hands, right thigh, and left forearm from wearing CR gloves averaged approximately 80%, to the right and left thighs and right forearm from wearing a coverall/suit by approximately 70%. Applicators using wettable powder formulations had significantly higher air, thigh, and forearm exposures than those using liquid formulations. Application method weights in the AHS algorithm were adjusted to nine for airblast and two for hand spray; protective equipment reduction factors were adjusted to 0.2 (CR gloves), 0.3 (coverall/suit), and 0.1 (both). The authors concluded that adjustment of application method, CR glove, and coverall weights in the AHS algorithm based on our exposure determinant findings substantially improved the correlation between the AHS algorithm and urinary metabolite levels.

Authors: Hines, Cynthia J.; Deddens, James A.; Coble, Joseph; Kamel, Freya; Alavanja, Michael C. R.
Full Source: Annals of Occupational Hygiene 2011, 55(6), 620-633 (Eng)
Dioxin exposure and cancer risk in the Seveso Women’s Health Study. ~w2012-02-28

2,3,7,8-Tetrachlorodibenzo-paradioxin (TCDD), a widespread environmental contaminant, disrupts multiple endocrine pathways. The International Agency for Research on Cancer classified TCDD as a known human carcinogen, based on predominantly male occupational studies of increased mortality from all cancers combined. After a chemical explosion on 10 July 1976 in Seveso, Italy, residents experienced some of the highest levels of TCDD exposure in a human population. In 1996, the authors initiated the Seveso Women’s Health Study (SWHS), a retrospective cohort study of the reproductive health of the women. Previouly, the authors have reported a significant increased risk for breast cancer and a nonsignificant increased risk for all cancers combined with individual serum TCDD, but the cohort averaged only 40 years of age in 1996. In the present study, the authors report results for risk of cancer from a subsequent follow-up of the cohort in 2008. Methods: In 1996, 981 women who were 0-40 years of age in 1976, lived in the most contaminated areas, and had archived sera collected near the explosion were recruited for the study. Individual TCDD concentration was measured in archived serum by high-resolution mass spectrometry. A total of 833 women participated in the 2008 follow-up study. The authors examined the relation of serum TCDD with cancer incidence using Cox proportional hazards models. In total, 66 (6.7%) women had been diagnosed with cancer. The adjusted hazard ratio (HR) associated with a 10-fold increase in serum TCDD for all cancers combined were significantly increased [adjusted HR 1.80; 95% confidence interval (CI): 1.29, 2.52]. For breast cancer, the HR was increased, but not significantly [adjusted HR 1.44; 95% CI: 0.89, 2.33]. The authors concluded that individual serum TCDD is significantly positively related with all cancer incidence in the SWHS cohort, more than 30 years later. This all-female study adds to the epidemiological evidence that TCDD is a multisite carcinogen.

Authors: Warner, Marcella; Mocarelli, Paolo; Samuels, Steven; Needham, Larry; Brambilla, Paolo; Eskenazi, Brenda
Full Source: Environmental Health Perspectives 2011, 119(12), 1700-1705 [English]
In which regions is breast-feeding safer from the impact of toxic elements from the environment?

2012-02-28

Owing to its unique nutritional and immunological characteristics, breast milk is the most important food source for infants. But, children are at greater risk for exposure to environmental toxicants from breast milk. The aim of this study was to evaluate the influence of environmental pollution on essential and toxic element contents of breast milk and determine the risky locations in our population. This study was conducted on women who were breastfeeding (n = 90). Milk samples were collected at three locations in Marmara region, Turkey: highly industrialised region highly affected by pollution, urbanised region moderately and rural area that is affected little. Breast milk samples (5 mL) were collected at approximately one month postpartum (mature milk). The concentrations of cadmium (Cd), cobalt (Co), chromium (Cr), copper (Cu), iron (Fe), manganese (Mn), nickel (Ni), lead (Pb) and zinc (Zn) in milk samples were compared to the milk samples coming from different locations. Lead, cadmium, nickel, chromium, iron and manganese levels in the breast milk are highest and engrossing especially in rural areas compared to the other regions but cobalt, copper, zinc levels are highest in highly industrial areas. The levels of essential and toxic elements in breast milk can vary in different regions. The authors concluded that the levels presented in the present study are above some countries’ data albeit not at toxic levels. Because of global effects, environmental pollution is not the problem for industrialising regions only. Rural area also may not be safe for breastfeed babies.

Authors: Cinar, Nursan; Ozdemir, Sami; Yucel, Oya; Ucar, Fatma
Bosnian Journal of Basic Medical Sciences 2011, 11(4), 234-239 (English)

Use of hair mineral analysis in the assessment of orthodontic patients’ exposure to metals

2012-02-28

In this study, the levels of Co, Cr, Cu, Fe, Ni, Ti, and Si were detected by inductively coupled plasma-optical emission spectrometry in hair samples from 25 university students chronically exposed (now or in the past) to the elements contained in fixed or removable orthodontic appliances. The results demonstrated that increased contents of all metals compared...
This study investigated the reference ranges for blood Cu, Mn, Se and Zn of 215 adult subjects non-occupationally exposed and living in the Nuoro province (Sardinia, insular Italy). Metals were detected by sector field inductively coupled plasma mass spectrometry after microwave-assisted acid digestion of blood. The blood reference ranges estimated as P5-P95 percentiles [geometric mean, GM] were 776-1495íg/L (1036 íg/L) for Cu; 4.73-17.0 íg/L (8.91 íg/L) for Mn; 106-185íg/L (140 íg/L) for Se and 4686-8585 íg/L (6418 íg/L) for Zn. These results were then stratified for sex, age, alcohol consumption, smoking habit and living area. The GM value of Cu was significantly higher in females (1127 íg/L) than in males (957 íg/L). Age, alcohol intake, smoking habit and residential area did not influence blood Cu. The GM of Mn was significantly higher in females (9.98 íg/L) respect to males (8.01 íg/L) and in drinkers (9.67 íg/L) compared to nondrinkers (8.38 íg/L). The other variables did not change the Mn data. Selenium concentrations did not differ significantly as a function of individuals factors. With reference to Zn, males had GM of 6804 íg/L and females of 6031 íg/L, and more blood Zn was found in subjects consuming alcohol (6618 íg/L) respect to abstainers (6155 íg/L). In addition, blood Zn was not affected by age, smoking habit and place of living.

Authors: Bocca, Beatrice; Madeddu, Roberto; Asara, Yolande; Tolu, Paola; Marchal, Juan A.; Forte, Giovanni
Full Source: Journal of Trace Elements in Medicine and Biology 2011, 25(1), 19-26 (Eng)

Environmental and social intervention strategies in lead exposure in children
2012-02-28
Exposure to heavy metals, even to small amounts can have a wide range of effects on children development and behaviour. There are three areas located in Transylvania (North West of Romania) with high nonferrous metals concentration in the environment: Baia Mare, Copsa Mica and...
This study describes a drilling slag discharge dust removal system for subsurface coal mining.

Drilling slag discharging dust remover for underground coal mine

A drilling slag discharge dust removal apply for subsurface coal mining is comprised of a straight pipe with a water pipe at one end and a gas pipe and gas inlet and a gas exhaust port at the opposite end, where the gas pipe outlet end is inside the straight pipe; at least one gas nozzle is positioned at the gas pipe outlet end; and each gas nozzle is positioned toward the gas exhaust port. This dust removal application uses high pressure gas injection; it has no moving or electrical elements so its operating environment is not restricted by gas concentrations. It has a simple structure, small volume, is light weight, conveniently transported and installed, has high dust removal efficiency (95% for inlet gas at any dust concentrations and no blockage.

Authors: Wang, Zhuliang; Sheng, Huaxing; Ding, Yanqin; Zhang, Jianxin
Full Source: Faming Zhuanli Shenqing CN 102,269,010 (Cl. E21F5/04), 7 Dec 2011, Appl. 10,197,091, 14 Jul 2011; 12pp. [Ch].

Zlatna. Copsa Mica is one of the areas of major interest in soil lead and cadmium contamination, soil being the major source of exposure for children aged 0 to 7 years old, as the population group with the highest susceptibility. Dispersion models and GIS are proposed for further use in order to assess the exposure of the children with the highest susceptibility along with some very specific intervention strategies. The goal is to implement a social marketing program in Copsa Mica in order to reduce lead and cadmium exposure by cutting the pathways [access to soil and dust]. To accomplish this goal, a cross-sector working group was established, including a multidisciplinary team with local teachers, community, physicians from local and regional Public Health Authority, the municipality, environmental health specialists from the Environmental Health Centre in Cluj-Napoca. The authors concluded that a tremendous decrease of blood lead level was recorded in Copsa Mica, but there are still many children with lead poisoning, which do require additional intervention efforts to avoid exposure and associated risks.

Authors: Lupu, Corina; Rugina, Corina; Neagu, Maria-Cristina; Neamtiu, Iulia Adina; Pop, Cristian; Gurzau, Eugen Stelian
Full Source: Environmental Engineering and Management Journal 2011, 10(1), 31-36 (Eng)
Online diagnosis device for exhaust purifier of diesel engine
2012-03-01
In this study, the authors discuss an online diagnosis device for exhaust purifier of diesel engines. The invention discloses an online diagnosis device for an exhaust purifier of a diesel engine. A purifier front exhaust temperature sensor and front exhaust pressure sensor are arranged on an exhaust pipe at the front end of the exhaust purifier close to the purifier. A purifier back exhaust temperature sensor is arranged on an exhaust tail pipe at the back end of the exhaust purifier close to the purifier. The purifier front exhaust temperature sensor and the purifier back exhaust temperature sensor are connected with a temperature signal comparator. The purifier front exhaust pressure sensor and the temperature signal comparator are connected with a central control unit. The central control unit performs comparison of the exhaust temperature difference signal and exhaust back pressure signal with the exhaust temperature difference threshold and the exhaust back pressure threshold to determine whether the purifier is in normal working state. The invention provides reliable online diagnosis characteristic signal for the online diagnosis for the exhaust purifier of the diesel engine.
Authors: Ning, Zhi; Lv, Ming; Yan, Kai
Full Source: Faming Zhuanli Shenqing CN 102,269,036 (Cl. F01N11/00), 7 Dec 2011, Appl. 10,184,757, 1 Jul 2011; 5pp. (Ch)

Integrative air purification and refrigeration apparatus used in underground refuge or rescue capsule of coal mine
12-03-01
An integrated air purification/refrigeration applying for subsurface coal mining refuge or rescue capsule is comprised of a reaction body with an air inlet and air outlet. An explosion-proof fan positioned at the air inlet; and drying, deodorisation, CO₂ adsorption, CO catalysis, and chemical refrigeration layers sequentially, separate installed from the air inlet end to the air outlet end inside the reaction body, all of which are mutually connected. This low cost apparatus has a small footprint, is simply regulated, and conveniently used with highly efficient good air treatment.
Authors: Sun, Qingmin; Zhou, Jianmin; Zhang, Jianzhong; Zhang, Chuanzhi
Full Source: Faming Zhuanli Shenqing CN 102,269,011 (Cl. E21F11/00), 7 Dec 2011, Appl. 10,184,757, 1 Jul 2011; 5pp. (Ch)