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Status of cadmium concentration in soil and vegetable irrigated with city effluent.

2007-09-19

Cadmium (Cd) is a toxic and carcinogenic element, and it causes different diseases for people like severe nausea, salivation vomiting, diarrhoea, abdominal pain and neuralgia when it comes into food chain at excessive concentration. It is also not included in the micronutrients for plant growth. Due to arid and semi arid conditions of Pakistan, rainfall is small, causing shortage of irrigation water. Because of this shortage, farmers largely use city effluents for raising vegetables in the areas around big cities, which are contaminated with industrial wastewater. The effluents from Pakistan third largest city (Faisalabad) are used as supplementary irrigation water to produce vegetables for human consumption. This paper reports a study on assessment of risks and opportunities associated with this practice, with emphasis on Cd, which can enter the food chain as an impurity in vegetables. Cd and other elements were measured in some typical effluents, four types of soils and many vegetables with no fertilizer application. It was found that the municipal effluents increased soil salinity, sodicity and Cd concentration. The Cd concentration in the vegetables was high above those normally associated with suitability for human consumption. There suggested that soluble Cd concentration in the effluents could be lessened by adding lime, concurrently lowering the sodium adsorption ratio and residual sodium carbonate of the effluents, thus making them safe for utilization on agricultural soils.

Authors: Farid, Sajid; Baloch, Musa Kaleem; Akhtar, Kanwar Saleem
Full Source: Yingyong Yu Huanjing Shengwu Xuebao 2006, 12(3), 414-419 (Pakistan)

A case study on Bangka Island, Indonesia on the habits and consequences of pesticide use in pepper plantations.

2007-09-19

This research investigated habits and consequences of pesticide use in pepper plantations in Indonesia. The first study was conducted by questioning 117 farmers about their habits in pesticide use and detergent pesticide residues on pepper berries on Bangka Island. Meanwhile, the second study was completed by analysing exposure levels of pesticide in farmers' bodies before and after pesticide application to pepper plantations at Sukamulya, West Java. Risks of pesticide exposure to below ground terrestrial invertebrates and aquatic ecosystems adjacent to the treated fields were evaluated using scenarios and a decision support system. Exposure study revealed that the residues in the urine and blood increased 6.5-10 and 1.1-1.5 folds, respectively indicating actual and direct exposures. The environmental risk assessment indicated low risks for the terrestrial below ground invertebrates but high potential risks for the aquatic ecosystem. The residues of the major pesticides were below the maximum residue limits. This study indicated that the farmers and their workers, and probably also the environment, were at risk of high exposure to the pesticides applied, but that the risks for the consumers were negligible, if present at all.

Authors: Wiratno; Taniwiryono, Darmono; Van den Brink, Paul J Rietjens, Ivonne M. C. M.; Murk, Albertinka J
Full Source: Environmental Toxicology 2007, 22(4), 405-414 (Indonesia)

This study analysed regulation of integrin (ITG) expression in PAH-exposed human macrophages in order to identify molecular targets of environmental polycyclic aromatic hydrocarbons (PAHs). Among ITG subunits, ITG was found to be markedly up regulated at both mRNA and protein levels in response to the prototypical PAH benzo(a)pyrene (BP). Knockdown of the transcription factor c-maf, known to control ITG expression, markedly impaired BP-mediated ITG induction. Moreover, chromatin immunoprecipitation and electrophoretic mobility shift assays showed BP-triggered binding of c-maf to a specific mafresponsive element found in ITG promoter. Such a binding, and also ITG induction, was however abolished in response to chem. inhibition of the aryl hydrocarbon receptor (AhR), to which PAHs bind. Taken together, these data establish ITG as a new mol. target of PAHs, whose up-regulation by these environmental contaminants most likely requires activation of co-operative pathways involving both AhR and c-maf.

Authors: Monteiro, Patricia; Gilot, David; Le Ferrec, Eric; Lecureur, Valerie; N'diaye, Monique; Le Vee, Marc; Podechard, Normand; Pouponnot, Celio; Fardel, Olivier

Full Source: Biochemical and Biophysical Research Communications 2007, 358(2), 442-448 (Eng)

This study analysed regulation of integrin (ITG) expression in PAH-exposed human macrophages...

Medical

Hydrolysis of pyrethroids by human and rat tissues: Examination of intestinal, liver and serum carboxylesterases.

This study investigated the distribution and activities of esterases that catalyse pyrethroid metabolism in vitro using several human and rat tissues, including small intestine, liver and serum. The authors found that the pyrethroid trans-permethrin is effectively hydrolysed by a sample of pooled human intestinal microsomes (5 individuals), while deltamethrin and bioresmethrin are not. This result correlates well with the substrate specificity of recombinant hCE2 enzyme. In contrast, a sample of pooled rat intestinal microsomes (5 animals) hydrolyse trans-permethrin 4.5-fold slower than the sample of human intestinal microsomes. Furthermore, it is demonstrated that pooled samples of cytosol from human or rat liver are 2-fold less hydrolytically active (normalized per mg protein) than the corresponding microsomal fraction toward pyrethroid substrates; however, the cytosolic fractions do have significant amts. (40%) of the total esteratic activity. Moreover, a 6-fold interindividual variation in carboxylesterase 1 protein expression in human hepatic cytosols was observed. Human serum was shown to lack pyrethroid hydrolytic activity, but rat serum has hydrolytic activity that is attributed to a single CE isoenzyme. The serum CE enzyme was purified to homogeneity to determine its contribution to pyrethroid metabolism in the rat. Both trans-permethrin and bioresmethrin were effectively cleaved by this serum CE, but deltamethrin, esfenvalerate, R-cypermethrin and cis-permethrin were slowly hydrolysed. Lastly, two model lipase enzymes were examined for their ability to hydrolyse pyrethroids. However, no hydrolysis products could be detected. Together, these results demonstrate that extrahepatic esterolytic metabolism of specific pyrethroids may be significant. Moreover, hepatic cytosolic and microsomal hydrolytic metabolism should each be considered during the development of pharmacokinetic models that predict the disposition of pyrethroids and other esterified compounds.
Evaluation of monoquaternary pyridinium oximes potency to reactivate tabun-inhibited human acetylcholinesterase.

2007-09-19

This research was to examine their potency as reactivators of tabun-inhibited human erythrocyte acetylcholinesterase (AChE; EC 3.1.1.7) by synthesizing monoquaternary N-benzyl-4-hydroxyiminomethylpyridinium bromide (Py-4-H) and its analogs with diverse substituents introduced into the Ph ring (Py-4-CH3, Py-4-Br, Py-4-Cl and Py-4-NO2). Although oximes Py-4-H and Py-4-NO2 did not show significant reactivation ability, these oximes might be of interest as pre-treatment drugs due to their high affinity for the native AChE. Docking studies were carried out to elucidate the differences in oximes potency. The orientations of all studied oximes in the active site of human AChE have been proposed by flexible ligand docking with AutoDock 3.0. Analyses of the obtained complexes revealed the presence of numerous hydrogen bonds and close contacts between the oximes and the residues in the active site. Final docked energies predicted correctly the relative order of the inhibition potency of compounds. (except in the case of Py-4-CH3) as well as the most probable orientation of the best reactivator, Py-4-Br, which can result in an attack on the phosphorus atom of the tabun-phosphorylated human AChE.

Authors: Odzak, Renata; Calic, Maja; Hrenar, Tomica; Primozic, Ines; Kovari, Zrinka
Full Source: Toxicology 2007, 233(1-3), 85-96 (Eng)

The inhibitory mechanism of methylmercury on differentiation of human neuroblastoma cells.

2007-09-19

This study examined the effect of MeHg on differentiation of human neuroblastoma SHSY5Y cells induced by all-trans-retinoic acid (RA). MeHg caused the impairment of the RA-induced G1/0 phase arrest; it was induced the reduction of G1/0 phase and S phase arrest. Extracellular signal regulated kinase 1/2 (ERK1/2) and protein kinase C (PKC) are involved in the RA-mediated differentiation and cell cycle progression. Activation of ERK1/2 by RA was increased more in MeHg-treated differentiating cells, comparing with only RA-treated groups. Furthermore, in both cases of inhibition of ERK1/2 with PD98059 or inhibition of PKC with GF109203X, RA/MeHg-induced ERK1/2 phosphorylation was reduced and G1/0 phase arrest was induced. Thus, it indicates that the neuronal differentiation with RA was mediated by the ERK1/2 and PKC related pathway and MeHg resulted in neurotoxic influences through the disturbance in steps of differentiation by this pathway. The authors also suggest that MeHg inhibits RA-induced differentiation in SH-SY5Y cells by a pathway dependent ERK1/2 and PKC.

Authors: Kim, Youn- Jung; Kim, Young-Seok; Kim, Mi-Soon; Ryu, Jae-Chun
Full Source: Toxicology 2007, 234(1-2), 1-9 (Korea)
Changes of serum protein in patients with acute organophosphorus poisoning and its clinical meaning

2007-09-19

The objective of the paper was to study the clinical significance and changes of serum protein in the patients with acute organophosphorus poisoning (AOPP). Patients were divided into three groups according to the degree of poisoning: the mild, moderate and severe groups. 3 ML blood samples were collected to measure total protein (TP), albumin (ALB), globulin (GLO), albumin/globulin (A/G) and C-reactive protein (CRP) on the 3rd day for each group, meanwhile, 30 healthy volunteers were measured as control (to eliminate all diseases that can change protein). Control group was measured for one time. Results showed that diseased group was compared with control group, except for the GLO, all others were obvious different (P < 0.01). Different degree poisoning groups compared with control group, except that TP and GLO in the mild and GLO in the moderate were indifferent, all others were obvious different (P < 0.01). The change of protein related with the degree of poisoning. Compared the different poisoning groups, the results were severe group > moderate group > mild group. In conclusion, to study the change of protein was helpful to monitor the degree of poisoning and guide treatment for patients with acute organophosphorus poisoning.

Authors: Liu, Hai-ying; Zhan, Hui; Zhang, Rui-xia; Liu, Xin-hua

Full Source: Zhongguo Jijiu Yixue 2006, 26(7), 496- 497 (China)
**Plasma 17-r-OH-progesterone in male workers exposed to traffic pollutants**

2007-10-01

This study evaluated whether occupational exposure to urban pollutants could cause alterations on 17-alfa-hydroxy-progesterone plasma levels and related diseases in male traffic policemen. 17-R-OH-P is synthesized in Leydig cells and in adrenals; it influences spermiogenesis, acrosoma reaction, testosterone biosynthesis, blocking of gonadotropin secretion. It also regulates learning, memory and sleep. After excluding principal confounding factors, such as rotating or night shifts, exposure to solvents, paints and pesticides during time-off and smoking, traffic policemen were matched with controls by age, working life and drinking habit. In total, 112 traffic policemen and 112 controls were included in the study. The authors found that the mean 17-R-OH values in traffic policemen were significantly higher than those in the control subjects. There was a significant distribution of 17-R-OH-P values in both groups. Furthermore, the results to the questionnaire showed an increased frequency in fertility disorders in traffic policemen compared to the controls, but the difference was not significant. The authors concluded that occupational exposure to low doses of chemical urban stressor, interacting with and adding to the psychosocial ones, could alter plasma 17-R-OH-P concentrations in traffic policemen. 17-R-OH-P could be used as an early biological marker, even before the onset of the reproductive and mental health diseases.

Authors: Tomei, Gianfranco; Ciarrocca, Manuela; Bernardini, Andrea; Capozzella, Assuntina; Rosati, Maria Valeria; Anzelmo, Vincenza; Caciari, Tiziana; Cardella, Claudia; Monti, Carlo; Tomei, Francesco

Full Source: Industrial Health 2007, 45(1), 170-176 (Eng)

**Mortality patterns among workers exposed to acrylamide: updated follow up**

2007-10-01

This study updated the mortality experience of a cohort of workers with and without potential exposure to acrylamide (AMD) at three U.S. plants and one plant in The Netherlands. Standardised mortality rates (SMRs) were calculated using local and national cohort rates using national and local rates as well as modelled internal cohort rates to assess site-specific cancer risks by demographic and work history factors and several exposure indicators for AMD. The results showed that for the 1925-2002 study period, there was both a deficit and excess overall mortality risk among the U.S. cohort for cancer sites implicated in experimental animal studies: brain and other central nervous system (SMR ) 0.67, confidence interval [CI] ) 0.40-1.05), thyroid gland (SMR ) 1.38, CI ) 0.28-4.02), testis and other male genital organs (SMR ) 0.64, CI ) 0.08-2.30); and for sites selected in earlier exploratory analyses of this cohort: respiratory system cancer (RSC) (SMR ) 1.17, CI ) 1.06-1.27), esophagus (SMR ) 1.20, CI ) 0.86-1.63), rectum (SMR ) 1.25, CI ) 0.84-1.78), pancreas (SMR ) 0.94, CI ) 0.70-1.22), and kidney (SMR ) 1.01, CI ) 0.66-1.46). None of the mortality excess were deemed to be significant, except for RSC, which was attributed earlier to muriatic acid exposure. In the Dutch cohort, deficits in deaths for were observed for all sites of a priori interest. An updated analysis of our previous exploratory findings for pancreatic cancer in the U.S. cohort revealed much less evidence of a possible exposure-response relationship with AMD. The authors concluded that AMD exposure at the levels explored during this study were not found to be associated with elevated cancer mortality risks.

Authors: Marsh, Gary M.; Youk, Ada O.; Buchanich, Jeanine M.; Kant, I. Jmert; Swaen, Gerard.
**Status of dust hazard in mini type talcum powder factory**

2007-10-01

This study investigated forty-eight mini type talcum powder factories in Junan. Dust concentration monitoring data from 2002-2004 were collected, and ventilation time and exposure duration were obtained by detection and investigation of workers at different operational posts. The results demonstrated that the dust hazard in different talcum factories was different, the dust concentration substandard rate of workers at coarse sieve and fine screen posts in factories with electro-precipitators was 2-3 times lower than that with settling chambers, and about 10 times lower than that without any de-dusting equipment. However, the dust concentration was still many times higher than standard concentration. The rate of factories with de-dusting equipment in Junan was 77.08%, which ran normally, and in which the rate with electro-precipitators was 33.33% and that with settling chambers was 43.75%. The authors concluded that dust control in Junan should be strengthened to meet the national health standards.

Authors: Li, Xia; Jiang, Hongjin; Liu, Yi

Full Source: Zhiye Yu Jiankang 2006, 22(5), 335-336 (Ch)

**Equation for calculating the concentration of solvent in air that discriminates between exposure and non-exposure based on biomarker concentrations in the urine of workers**

2007-10-01

This literature looks at the development of a new method for evaluating the intensity of workers’ exposures to toluene, either by itself or in conjunction with mixed solvents. Regression equations were calculated between the concentrations of toluene to which workers were exposed and the concentrations of hippuric acid or toluene in workers’ urine samples taken at the end of their shifts. Thereafter, the discriminant exposure concentration of the solvents in air, which was the concentration considered to discriminate exposure from non-exposure within a fixed level of error using fiducial ranges of individual specimens (DEC-I) or using confidence ranges of regression equation (DEC-R), was measured by a scale. These equations were then applied to calculate DEC-I or DEC-R accurately using the formulas expressing a regression line and its fiducial ranges or confidence ranges. The authors concluded that these equations can calculate not only more precise values of DEC-I or DEC-R than can be measured by a scale, but can also calculate values corresponding to any level of error. Moreover, DEC-I and DEC-R can be defined by the equations. The concentration capable of discriminating TLV (threshold limit value) exposure from non-TLV exposure was estimated using fiducial ranges (DTL-I) and then using confidence ranges of the regression equation (DTL-R).

Authors: Ogata, Masana; Kakuwa, Katsutoshi; Kondo, Yoshiro

Full Source: Acta Medica Okayama 2006, 60(6), 331-344 (Eng)

**Have occupational exposures to chemical agents and the related health risks decreased in Finland?**

2007-10-01.

This literature examines the trends in occupational exposures to chemical...
agents and the related occupational diseases and symptoms from the 1960's to present. The FINJEM exposure matrix (numbers of those exposed and the exposure levels), the Register of Occupational Diseases (numbers of occupational diseases) and the national interview surveys (perceived chemical hazards and risks) were the major data sources for the study. The authors found that there was a decrease of 50-60% for the number of workers exposed to hazardous chemical agents via the respiratory tract since the 1960-1984 period in Finland. In addition, to some extent dermal exposure has also decreased. The changing occupational structure of the employed population has contributed to this reduction. The decrease in heavy exposures has been stronger than the average decrease, suggesting that labour safety measures have focused on prevention and have been appropriately targeted. Asbestos, lead, environmental tobacco smoke and chemical agents occurring in agriculture are examples of exposures that have been substantially reduced. However, tens of thousands of workers are still exposed to concentrations known to be harmful, or handle agents hazardous to the skin, resulting in about 2000 occupational diseases annually. Furthermore, over one million workers (out of 2.4 million employed) are exposed temporarily or regularly to dusts, gases and other chemical agents. About half of them consider the exposure as rather or very harmful.

Authors: Kauppinen, Timo; Heikkila, Pirjo; Luukkonen, Ritva
Full Source: Tyo ja Ihminen 2006, 20(3), 236-248, 263 (Finnish)
Human accumulation of mercury in Greenland

2007-10-01

The traditional diet in the arctic exposes people to high intakes of mercury, especially from marine animals. This study investigated whether the mercury is accumulated in humans, by analysing autopsy samples of liver, kidney, and spleen from adult ethnic Greenlanders who died between 1990 and 1994 from a wide range of causes, natural and violent. Liver, kidney, and spleen samples from between 33 and 71 case subjects were analysed for total mercury and methylmercury, and liver samples also for selenium. The results showed that metal levels in men and women did not differ and were not related to age except in one case, i.e., for total mercury in liver, where a significant declining concentration with age was observed. The highest total mercury levels were found in the kidney followed by the liver and spleen. Methylmercury followed the same pattern, but levels were much lower, constituting only 19% of the total mercury concentration in the liver and spleen and 93% in the kidney. In liver, selenium was found in surplus to mercury on a molar basis. The authors concluded that the mercury concentrations in the liver and kidneys of Greenlanders were elevated compared to levels in the general population in Japan, Korea, and several European countries, except in the Faroe Islands where mercury levels were 2-3 times higher. This is in accordance with the expected exposure of mercury in the diet.

Full Source: Johansen, Poul; Mulvad, Gert; Pedersen, Henning Sloth; Hansen, Jens C.; Riget, Frank

Full Source: Science of the Total Environment 2007, 377(2-3), 173-178 (Eng)

Children's exposure to pesticides used in homes and farms

2007-10-01

Common and residential use of pesticides is common in El Paso, Texas, especially in agricultural areas. There have been recent concerns over the type of pesticides used by residents because of the ease with which methyl parathion can be obtained from the neighbouring border city of Juarez in Chihuahua, Mexico. During the study, survey data were collected in regards to residents’ perceptions about pesticide safety and use of pesticides, and their preferred source of health information. The responses were assessed regarding the number of respondents who were using the illegal pesticide methyl parathion, known locally as polvo de avion (airplane dust) as well as their beliefs concerning the safety and efficacy of pesticides. The study found that 88.7 percent used some type of pesticide, and of these, 9.8 percent reported using methyl parathion. The authors concluded that biological/environmental testing would be useful to assess use of methyl parathion and to determine the types of pesticides used by local farmers.

Authors: Saller, Jeremy; Reyes, Priscilla; Maldonado, Pedro A.; Gibbs, Shawn G.; Byrd, Theresa L.

Full Source: Journal of Environmental Health 2007, 69(7), 27-31 (Eng)

Extracting rate of three kinds of pesticides in tea during brewing process and risk assessment on human health

2007-10-01

This study evaluated the extracting rate of three different types of pesticides (triazophos, endosulfan and cyhalothrin) during the tea brewing process. The pesticides were sprayed separately in the tea garden. The green shoots were harvested from treated plots at 2, 5, 9, 14 and 21 days after the treatment,
and manufactured into green tea. The concentration of the above-mentioned pesticides in made tea, tea infusion and infused leaves was determined by gas chromatography. Dissipation behaviour of pesticide residue in made tea and tea infusion was investigated. The results showed that the residue level of pesticide in made tea and tea infusion decreased gradually while the plucking interval increased. The concentration of pesticide residue in tea infusion was positively related with that in made tea. The average extracting percentage of residue from made tea to infusion was 29.06% (triazophos), 5.11% (endosulfan) and 1.73% (lambda-cyhalothrin) respectively, and the insoluble residue remained in infused leaves. The authors concluded that by comparing the intake amounts of pesticide residue possibly to human body via the tea infusion drinking with ADI of the pesticides, the results showed that the risk to human health from three kinds of pesticide residue by infusion drinking was very small, which was only ranged in 10-3-10-5 level.
Authors: Wu, Xue-yuan; Sheng, Xuan; Fan, Wei; Tang, Feng; Yue, Yong-de
Full Source: Chaye Kexue 2007, 27(2), 141-146 (Ch)

Chemical behaviour of residential lead in urban yards in the United States
2007-10-01
Long after federal regulations banned the use of lead-based paints and leaded gasoline, residential lead remains a persistent challenge. Soil lead is a significant contributor to this hazard and an improved understanding of physicochemical properties is likely to be useful for in situ abatement techniques such as phytoremediation and chemical stabilization. A laboratory characterisation of high-lead soils collected from across the United States shows that the lead contaminants were concentrating in the silt and clay fractions, in the form of discrete particles of lead, as observed by SEM coupled with energy dispersive X-ray analysis. Soil lead varied widely in its solubility behaviour as assessed by sequential and chelate extractions. The authors concluded that as site-specific factors (e.g., soil pH, texture, etc.) are believed to govern the solubility of the lead, understanding the variability in these characteristics at each site is necessary to optimise in situ remediation or abatement of these soils.
Authors: Elless, M. P.; Bray, C. A.; Blaylock, M. J.
Full Source: Environmental Pollution (Amsterdam, Netherlands) 2007, 148(1), 291-300 (Eng)

Hazardous air pollutants in industrial area of Mumbai - India
2007-10-01
Hazardous Air Pollutants (HAPs) have a potential to be distributed into different component of environment with varying persistence. This study investigates fourteen HAPs quantified in the air using TO-17 method in an industrial area of Mumbai. The distribution of these HAPs in different environmental compartments have been calculated using multi media mass balance model, TaPL3, along with long range transport potential and persistence. The results demonstrated that most of the target compounds partition mostly in air. Phenol and trifluralin, partition predominantly into soil while Et benzene and xylene partition predominantly into vegetation compartment. Naphthalene has the highest persistence followed by Et benzene, xylene and 1,1,1 trichloro ethane. Long-range transport potential is maximum for 1,1,1 trichloroethane. Assessment of human health risk in terms of non-carcinogenic hazard and carcinogenic risk due to exposure to...
HAPs have been estimated for industrial workers and residents in the study area considering all possible exposure routes using the output from TaPL3 model. The overall carcinogenic risk for residents and workers are estimated as high as unity along with very high hazard potential.

Authors: Srivastava, Anjali; Som, Dipanjali
Full Source: Chemosphere 2007, 69(3), 458-468 (English)
Copolyimide membranes for gas separation.
2007-09-19
This research developed co-polyimide membranes for O2/N2, CO2/CH4 separation applications, and examined structure/property relationships for proper membrane material selection. Co-polyamide 1H-NMR data confirmed the presence of polyimide structures in the polymers. High glass transition temperatures were obtained, indicating good thermal stability for co-polyimides. Of the tested co-polyimides, highest permeability and O2/N2 and CO2/CH4 selectivity were determined for 4,4-hexafluoroisopropylidenediphthalic anhydride/3,3,4,4-tetrabenzophenonetetra-carboxylic dianhydride-4,4-oxydianiline. Introduction of a 4,4-hexafluoroisopropylidenediphthalic anhydride into the polyimide structure enhanced membrane separate properties.
Authors: O. Orcun; Sen, Serhat; Atalay-Oral, Cigdem; Guner, F. Seniha; Tantekin-Ersolmaz, S. Birgul
Full Source: Desalination 2006, 200(1-3), 259-261 (Turkey)

Use of nutraceuticals for prevention of occupational fluorosis.
2007-09-19
The article deals with pathogenesis of occupational fluorosis. Clinic studies demonstrated changes in bone mineral d. among workers with 15-20 years of service. Experimental studies proved that occupational fluorosis is associated with calcium homeostasis, bone tissue resorption and calcium washout. Nutraceuticals (“Zolotoi shar”, “Korallovy kalcii”) in occupational fluorosis play preventive role. Rats were also treated with av. toxic dose of NaF for 9 wk as a model of fluorosis. Results are given.
Authors: Ulanova, E. V.; Anokhina, A. S.; Danilov,
Full Source: Meditsina Truda i Promyshlennaya Ekologiya 2006, (6), 44-48 (Russia)

Exploratory Investigation of the Risk of Desorption from Activated Carbon Filters in Respiratory Protective Devices.
2007-09-19
There is a tendency to equip filtering respiratory protective devices with a blower system to lower breathing resistance. Since there is continuous airflow through the filter, the undesirable possibility that adsorbed contaminants are released from the filter is enhanced. This study examined whether there is a significant risk that physi- or chemi-sorbed contaminants desorb from the filter. Measurements were made under various conditions using cyclohexane, a physi-sorbed vapour and NH3, a chemisorbed gas. For a certain time, an activated C filter bed was exposed to cyclohexane or NH3, followed by a period of clean airflow. The authors found that respiratory protective devices with a continuous airflow can release previously adsorbed contaminants at too high concentrations. Under humid conditions, the release of physi-sorbed contaminants occurred even more rapidly than under dry conditions.
Authors: Linders, Marco J. G.; Baak, Piet J.; van Bokhoven, Jacques J. G. M.
Full Source: Industrial & Engineering Chemistry Research 2007, 46(12), 4034- 4039 (Netherlands)