

# Bulletin Board

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## CHEMICAL EFFECTS

**Occurrence, distribution and human exposure of several endocrine disrupting chemicals in indoor dust: A nationwide study**

2020-08-17

Parabens, triclosan (TCS), triclocarban (TCC), and bisphenol A and its analogues (BPs) are used in various industrial and consumer products and typical endocrine disrupting chemicals (EDCs). In this study, six parabens, TCS, TCC, and eight BPs were determined in 289 indoor dusts collected from different geographical regions, China. Ten of 16 target compounds were found in >50% samples. Concentrations of  $\sum 6$  parabens,  $\sum [TCS+TCC]$ , and  $\sum 8$  BPs in indoor dust ranged from 8.66-21,500 (median: 288), 19.6-8,940 (104), and 8.80-37,400 (377) ng/g dw, respectively. The  $\sum [TCS+TCC]$  concentrations in dust from Northeast China were higher than those from Central South China ( $p < 0.05$ ). The concentrations of  $\sum 8$  BPs found in dust from Eastern China were approximately 2 times higher than those found for North China ( $p < 0.05$ ), whereas there was no significant spatial difference in concentrations of parabens among different geographical regions ( $p > 0.05$ ). Human exposure to these EDCs through indoor dust ingestion and dermal absorption was evaluated. The median and 95th percentile estimated daily intakes of  $\sum 16$  EDCs ranged from 0.439 (adults)-4.57 (infants) and 6.26 (adults)-62.1 (infants) ng/kg bw/day, respectively, generally decreasing with increasing age. This nationwide survey establishes a baseline concentration for parabens in the indoor environment in China.

Authors: Qingqing Zhu, Mei Wang, Jiabao Jia, Yu Hu, Xin Wang, Chunyang Liao, Guibin Jiang

Full Source: Environmental science & technology 2020 Aug 17. doi: 10.1021/acs.est.0c04299.

**Chemicals inhaled from spray cleaning and disinfection products and their respiratory effects. A comprehensive review**

2020-08-15

Spray cleaning and disinfection products have been associated with adverse respiratory effects in professional cleaners and among residents doing domestic cleaning. This review combines information about use of spray products from epidemiological and clinical studies, in vivo and in vitro toxicological studies of cleaning chemicals, as well as human and

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field exposure studies. The most frequent chemicals in spray cleaning and disinfection products were compiled, based on registrations in the Danish Product Registry. The chemicals were divided into acids, bases, disinfectants, fragrances, organic solvents, propellants, and tensides. In addition, an assessment of selected cleaning and disinfectant chemicals in spray products was carried out. Chemicals of concern regarding respiratory effects (e.g. asthma) are corrosive chemicals such as strong acids and bases (including ammonia and hypochlorite) and quaternary ammonium compounds (QACs). However, the evidence for respiratory effects after inhalation of QACs is ambiguous. Common fragrances are generally not considered to be of concern following inhalation. Solvents including glycols and glycol ethers as well as propellants are generally weak airway irritants and not expected to induce sensitization in the airways. Mixing of certain cleaning products can produce corrosive airborne chemicals. We discuss different hypotheses for the mechanisms behind the development of respiratory effects of inhalation of chemicals in cleaning agents. An integrative assessment is needed to understand how these chemicals can cause the various respiratory effects.

Authors: Per A Clausen, Marie Frederiksen, Camilla S Sejbæk, Jorid B Sørlø, Karin S Hougaard, Karen B Frydendall, Tanja K Carøe, Esben M Flachs, Harald W Meyer, Vivi Schlünssen, Peder Wolkoff

**Removal of trace organic pollutants (pharmaceuticals and pesticides) and reduction of biological effects from secondary effluent by typical granular activated carbon**

2020-08-10

Residual trace organic pollutants (TOPs) and associated biological effects from secondary effluent (SE) are attracting much attention because of their safety concerns. Granular activated carbon (GAC) adsorption, due to its low cost and high efficiency, is widely applied for further wastewater treatment, but its selective removals of TOPs and biological effects are poorly understood. In the present study, the surface physicochemical characteristics of four types of typical GACs were investigated, and their correlation with luminescent bacteria toxicity was discussed. Based on the biological effect control, shell GAC, with a great adsorption capacity and high functional group contents was selected for further study, including for the removal of fluorescent dissolved organic matter (DOM), 21 TOPs, and 3 biological effects. The shell GAC showed a promising property of removing fluorescent DOM and TOPs. The total concentration of 21 detected TOPs, including 12 pesticides and 9 pharmaceuticals, achieved 82% removal when 30 g/L shell GACs was added. Individual chemicals

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removal by GAC adsorption was not well described by an individual parameter (e.g., logD, molecular size, charge, functional groups), but rather by a variety of physical and chemical interactions among TOPs, DOM, and GAC. The biological effects from SE were mainly caused by TOPs and DOM. Hence, shell GACs also showed high removal efficiencies of luminescent bacteria toxicity, genotoxicity, and photosynthetic inhibition effect. The removal mechanisms of the three biological effects from SE were deeply discussed. Therefore, the GAC treatment is considered to be one of the most suitable options to ensure the ecological safety of discharged wastewater, because it can effectively control DOM, TOPs, and associated biological effects.

Authors: Lei Tang, Xiaoyan Y Ma, Yongkun Wang, Shiyong Zhang, Kai Zheng, Xiaochang C Wang, Yu Lin

Full Source: The Science of the total environment 2020 Aug 10;749:141611. doi: 10.1016/j.scitotenv.2020.141611.

## ENVIRONMENTAL RESEARCH

### Indoor air quality at school and students' performance: Recommendations of the UNESCO Chair on Health Education and Sustainable Development & the Italian Society of Environmental Medicine (SIMA)

2020-07-12

The issue of indoor air quality (IAQ) concerns 64 million students across Europe, but it is still a neglected topic, although it impacts both their health and learning outcomes. Classroom microclimate is the first key factor determining a healthy or unhealthy school environment, and it is influenced by ventilation, temperature and humidity rate. Classrooms are usually crowded, overheated and poorly ventilated, thus resulting in possible increases of carbon dioxide (CO<sub>2</sub>), that can cause several problems when its concentrations exceed the value of 0.15 percentage volume of CO<sub>2</sub> (1500 ppm) or even at lower levels (1000 ppm). CO<sub>2</sub> can also arise from outside the school, being widely produced by the combustion of fossils or road traffic. Anthropogenic activities are responsible for the emission of nitrogen dioxide (NO<sub>2</sub>) and polycyclic aromatic hydrocarbons (PAH) too, which represent other possible external contaminants potentially impairing IAQ. Further dangerous exposures for students' health are those related to natural emission of gas Radon, which typically accumulates in poorly ventilated classrooms, and volatile organic compounds (VOCs, released by building materials, paints, furnishings, detergents), while chemicals

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substances (i.e. cyanoacrylate, lead, cadmium, nickel) might be contained in school materials. Finally, particulate matter (PM<sub>2.5</sub> and PM<sub>10</sub>) originating from road traffic, domestic heating or industrial activities represent additional possible contaminants impacting schools' air quality. Poor IAQ might result in mild adverse events (i.e. headaches, nausea etc.) or cause respiratory problems. More frequently, IAQ affects students' attention and their school performances, as widely documented by many studies. Standardized tests administered to pupils exposed to poor IAQ (to assess reading and mathematical abilities) systematically result in worse outcomes compared to students staying in healthy classroom environments. In this paper, we present recommendations of UNESCO Chair on Health Education and Sustainable Development and Italian Society of Environmental Medicine (SIMA) to ensure an optimal IAQ at school, including some post-COVID-19 issues.

Authors: Manuela Pulimeno, Prisco Piscitelli, Salvatore Colazzo, Annamaria Colao, Alessandro Miani

Full Source: Health promotion perspectives 2020 Jul 12;10(3):169-174. doi: 10.34172/hpp.2020.29.

### Emerging contaminants in aquatic environments and coastal waters affected by urban wastewater discharge in Thailand: An ecological risk perspective

2020-08-12

Emerging contaminants such as synthetic musks and UV-filters as ingredients personal care products were widely used in human daily life in Thailand. The occurrence and fate of four synthetic musks and nine UV-filters were investigated in eight full-scale sewage treatment plants (STPs) and their receiving aquatic environments in Bangkok and Pattaya, Thailand. All target compounds were detected in every single sample from STPs and surface water with magnitude from ng/L to µg/L. HHCB-lactone and HMS were found as the predominant musk and UV filter in influent and effluent of STPs, respectively. HHCB-lactone was also found with the highest concentration up to 79501 ng/g (dw) in the sludge. Low removal efficiency range from -37% (HHCB-lactone) to 58% (AHTN) were found for four musks in the STPs. The total emission of 4 musks and 9 UV-filters were estimated to be up to 16.7 mg/person/day and 0.28 mg/person/day by the STPs. Three synthetic musks and seven UV-filters were detected in fish from the receiving river. Concentration and emission of musks and UV filters found in this study from Thailand were much higher than those reported in many other countries worldwide. The preliminary ecological risk assessment showed that Musk xylene, 4-MBC and OC

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may pose high risk to aquatic organisms in the riverine and estuarine environment in Thailand.

Authors: Kanokthip Juksu, You-Sheng Liu, Jian-Liang Zhao, Li Yao, Charoon Sarin, Siranee Sreesai, Pantip Klomjek, Atsadang Traitangwong, Guang-Guo Ying

Full Source: Ecotoxicology and environmental safety 2020 Aug 12;204:110952. doi: 10.1016/j.ecoenv.2020.110952.

### Presence and risk assessment of herbicides in the marine environment of Camps Bay (Cape Town, South Africa)

2020-10-10

The present study was conducted during a time of drought to assess the concentration of herbicides and their potential for accumulation in marine biota found in the near shore marine environment of an urban setting (Camps Bay, Cape Town, South Africa). The purpose was to establish whether raw sewage containing selected persistent chemicals that are released through a local marine outfall would be sufficiently diluted by the ocean to prevent impact on the near-shore marine environment of the suburb Camps Bay. Samples of seawater, sediment, seaweed, and selected marine organisms present in the near shore environment, such as limpets (*Cymbula granatina*), mussels (*Mytilus galloprovincialis*), and sea urchins (*Parechinus angulosus*), were analysed for five indicator herbicides, namely atrazine, alachlor, simazine, metolachlor, and butachlor, with gas chromatography coupled with a mass spectrometer. The concentration of the compounds detected ranged from below the limit of detection (<LOD) to 4.2 ng/L in seawater, <LOD to 45.3 ng/g dry weight (dw) in sediments, <LOD to 157.8 ng/g dw in marine organisms, and between 12.3 and 87.0 ng/g dw in seaweed. Results of ecological risk assessment for acute and chronic risk, calculated following the US Environmental Protection Agency method, showed a possible threat to the near shore environment from sewage released by the marine outfall, as the herbicide contamination in the biota posed a low to high ecotoxicological risk for marine organisms. The hazard quotients and carcinogenic risk caused by herbicide pollution in Camps Bay seawater were above the acceptable level indicating that these chemicals pose adverse health effects, should an average sized human (70 kg) consume any of the marine species analysed herein on a daily basis (daily consumption of 54 g), over a lifetime period (life expectancy of 70 years). The study also indicated the extensive use of these herbicides for cosmetic and ornamental purposes in gardening, or for weed control in an urban setting, thus, it is apparent that consumers and municipalities

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need to be educated about their inadvertent use and safe disposal of these compounds. The use of these herbicides to control weeds within the area and discharge of sewage to Camps Bay must be checked through adequate control of the trade, handling of herbicides, and enforcement of appropriate sanctions and development of suitable regulations.

Authors: Cecilia Y Ojemaye, Chionyedua T Onwordi, Daniela M Pampanin, Magne O Sydnes, Leslie Petrik

Full Source: The Science of the total environment 2020 Oct 10;738:140346. doi: 10.1016/j.scitotenv.2020.140346.

### OCCUPATIONAL

#### Occupational respiratory morbidity among hair and beauty salon workers in Udipi taluk, Karnataka, India

2020-08-16

Background: The Indian hair and beauty salon industry is growing rapidly due to the demand for beauty and personal care services and products. Workers in the industry are vulnerable to several occupational factors such as chemicals, confined space, and poor ventilation. Chemicals in the products used are known or suspected to cause allergies, respiratory, neurological and reproductive health problems and cancer. Methods: The present study was carried out to determine the factors associated with the occurrence of respiratory morbidity among hair and beauty salon workers of Udipi taluk, Karnataka, India. A total of 240 salon workers were recruited for the study. A semistructured, interviewer-led questionnaire was used to collect data. Peak expiratory flow rate (PEFR) was done using a JSB peak flow meter. Results: The frequency of respiratory morbidity among participating beauty salon workers was 19%. Men reported respiratory symptoms more frequently than women. Receiving training on work materials and practices was a significant protective factor (odds ratio = 0.3; 95% confidence interval: 0.1-0.7) for the occurrence of respiratory morbidity. The mean observed PEFR in these workers was significantly lower than their predicted values. While 61.2% of the workers were using some form of personal protective equipment, only 4% of workers used a mask or respiratory protection.

**Background: The Indian hair and beauty salon industry is growing rapidly due to the demand for beauty and personal care services and products.**

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Conclusion: Hair and beauty salon workers are at risk of developing respiratory morbidity potentially from harmful exposures and lack of effective control measures at the workplace.

Authors: Shubhi Tomar, Rajnarayan R Tiwari, Garima Verma

Full Source: American journal of industrial medicine 2020 Aug 16. doi: 10.1002/ajim.23171.

### Noise exposure among teachers in technology educational shops in selected British Columbia, Canada, high schools

2020-08-21

Teachers in technology education shops (TESs) in high schools are at risk from exposure to occupational hazards, including physical work demands and chemicals, particulate matter and noise, as well as non-optimal working conditions negatively affected by temperature, humidity, and lighting. This study evaluated the exposure to noise of 17 TES teachers working in 17 wood-working, metal-working, and automotive shops in selected high schools in British Columbia, Canada, and examined the quality of the acoustical teaching environments due to background noise. This study characterized noise control measures in the sampled TESs and observed the safety practices of teachers during TES classes. The results of this investigation indicated that almost 60% of the participating teachers were exposed to unacceptable levels of noise during teaching and working in TESs. It also showed that TES acoustical environmental quality was adversely affected by high background noise levels due to poor room designs and settings. Practical recommendations were provided to reduce and control the exposure to noise in TESs and to enhance the quality of health, safety, and quality of teaching environment in these TESs.

Authors: Ahmed Saleh Summan, Karen Bartlett, Hugh Davies, Mieke Koehoorn

Full Source: Journal of occupational and environmental hygiene 2020 Aug 21;1-7. doi: 10.1080/15459624.2020.1803494.

**Teachers in technology education shops (TESs) in high schools are at risk from exposure to occupational hazards, including physical work demands and chemicals, particulate matter and noise, as well as non-optimal working conditions negatively affected by temperature, humidity, and lighting.**

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## PHARAMACEUTICAL/TOXICOLOGY

### Kupffer cell depletion attenuates IL-6/STAT3 mediates hepatocyte apoptosis in immunological liver injury of trichloroethylene sensitized mice

2020-08-18

Trichloroethylene (TCE) induced TCE hypersensitivity syndrome which makes immune injuries in multi-system. The multiple organ damage included skin, liver, kidney and so on. The main manifestations of liver injuries were apoptosis and edema of hepatocytes. In our previous research, we found the activation of Kupffer cells (KCs) which increased IL-6 can aggravate liver cell apoptosis in TCE sensitized mice. However, the mechanism of IL-6 in liver damages induced by TCE was not clear. This study explored the function of IL-6/STAT3 signal pathway on the TCE induced apoptosis of liver cell. We established a TCE sensitized BALB/c mouse model with a KCs inhibitor GdCl<sub>3</sub>, we found that the expressions of ALT and AST in TCE sensitization positive mice were higher than other mice, and the expressions of apoptosis-related proteins were up-regulated in TCE sensitization positive mice, GdCl<sub>3</sub> could alleviate this process. Meanwhile, GdCl<sub>3</sub> could significantly decrease the expressions of IL-6/STAT3 proteins. All in all, the activation of KCs can increase the expression of IL-6, IL-6R and phosphorylate STAT3, induces hepatocyte apoptosis, and participates in immunity damage of liver which induced by TCE.

Authors: Jia-Xiang Zhang, Na Li, Qiong-Ying Xu, Yi Yang, Hai-Bo Xie, Tong Shen, Qi-Xing Zhu

Full Source: International immunopharmacology 2020 Aug 18;88:106897. doi: 10.1016/j.intimp.2020.106897.

### CD70 antibody-drug conjugate as a potential therapeutic agent for uterine leiomyosarcoma

2020-08-18

Background: Uterine leiomyosarcoma is a rare and aggressive gynecologic malignancy originating in the myometrium of the uterine corpus that tends to recur even after complete surgical excision. Current therapeutic agents have only modest effects on uterine leiomyosarcoma. Although antibodies and antibody-drug conjugates (ADCs) have been recognized as useful targeted therapies for other cancers, no study has yet evaluated the effects of this approach on uterine leiomyosarcoma.

**Trichloroethylene (TCE) induced TCE hypersensitivity syndrome which makes immune injuries in multi-system.**

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**Objective:** To examine the activity of tumoral cluster of differentiation 70 (CD70) in uterine leiomyosarcoma and assess the antitumor activity of CD70-ADC treatment in uterine leiomyosarcoma.

**Study design:** Target membrane proteins were screened by profiling and comparing membrane protein expression in three uterine leiomyosarcoma cell lines (SK-UT-1, SK-LMS-1, and SKN) and normal uterine myometrium cells using the isobaric tags for relative and absolute quantitation labeling method. Western blotting, fluorescence-activated cell sorting analyses, and immunohistochemistry were used to examine CD70 expression in the membrane proteins in uterine leiomyosarcoma cell lines and clinical samples. We developed an ADC with a monoclonal antibody of the target membrane protein linked to monomethyl auristatin F (MMAF) and investigated its antitumor effects against uterine leiomyosarcoma (in-vitro, in-vivo, and in patient-derived xenograft [PDX] models).

**Results:** CD70 was identified as a specific antigen highly expressed in uterine leiomyosarcoma cell lines. Of the three uterine leiomyosarcoma cell lines, CD70 expression was confirmed in SK-LMS-1 cells by western blotting and fluorescence-activated cell sorting analysis. CD70 overexpression was observed in 19 of 21 (90.5%) tumor specimens from women with uterine leiomyosarcoma. To generate CD70-ADC, anti-CD70 monoclonal antibody was conjugated with a novel derivative of MMAF. CD70-ADC showed significant antitumor effects on SK-LMS-1 cells (IC<sub>50</sub> 0.120 nM) and no antitumor effects on CD70-negative uterine leiomyosarcoma cells. CD70-ADC significantly inhibited tumor growth in the SK-LMS-1 xenograft mouse model (tumor volume: 129.8 versus 285.5 mm<sup>3</sup>, 54.5% relative reduction, P<0.001) and PDX mouse model (tumor volume: 128.1 versus 837.7 mm<sup>3</sup>, 84.7% relative reduction, P<0.001).

**Conclusion:** Uterine leiomyosarcoma tumors highly express CD70 and targeted therapy with CD70-ADC may have a potential therapeutic implication in the treatment of uterine leiomyosarcoma.

**Authors:** Ruriko Nakae, Shinya Matsuzaki, Satoshi Serada, Koji Matsuo, Mayu Shiomi, Kazuaki Sato, Yoshikazu Nagase, Satoko Matsuzaki, Satoshi Nakagawa, Kosuke Hiramatsu, Akiko Okazawa, Toshihiro Kimura, Tomomi Egawa-Takata, Eiji Kobayashi, Yutaka Ueda, Kiyoshi Yoshino, Tetsuji Naka, Tadashi Kimura

**Full Source:** American journal of obstetrics and gynecology 2020 Aug 18;S0002-9378(20)30856-5. doi: 10.1016/j.ajog.2020.08.028.