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Chemosphere. 2006 Jul;64(4):579-87. Epub 2006 Jan 10.

Influence of a municipal solid waste incinerator on ambient air and soil PCDD/Fs levels.

[Oh JE](#), [Choi SD](#), [Lee SJ](#), [Chang YS](#).

Source Department of Environmental Engineering, Pusan National University, Geumjeong-gu, Pusan 609-735, Republic of Korea.

Abstract To examine the influence of polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans (PCDD/Fs) emissions from a municipal solid waste incinerator (MSWI) on the environment, we measured the levels of PCDD/Fs in ambient air and soil samples collected near a MSWI in Bucheon, Korea. The PCDD/Fs concentrations in the ambient air samples ranged from 0.22 to 1.16 pg I-TEQm⁻³ (13.39-75.16 pg m⁻³), with an average of 0.66 pg I-TEQ m⁻³ (35.62 pg m⁻³). The soil samples contained between 1.25 and **74.98 pg I-TEQ g⁻¹** (38.15-3,303.33 pg g⁻¹), with an average of 19.06 pg I-TEQ g⁻¹ (1,077.11 pg g⁻¹). **These levels were higher than those previously reported by other investigators in a number of surveys.** The furan homologues predominated in the air samples and some soil samples, and the soil PCDD/Fs levels decreased with increasing distance from the MSWI. Comparison of the homologue patterns and a multivariate statistical analysis showed that **PCDD/Fs emission from the MSWI directly affected the pattern of PCDD/Fs in air, while the PCDD/Fs patterns in soil differed according to the location relative to the MSWI, roads, and construction sites.** **These results collectively indicate that the MSWI was the major PCDD/Fs emission source in this area,** but that unidentified combustion sources and vehicles might influence the environment to some extent.
PMID: 16410018 [PubMed - indexed for MEDLINE]

<http://www.ncbi.nlm.nih.gov/pubmed/21420146/>

2011 May 1;409(11):2019-28. doi: 10.1016/j.scitotenv.2011.02.032. Epub 2011 Mar 21.

Burden of disease attributable to air pollutants from municipal solid waste incinerators in Seoul, Korea: a source-specific approach for environmental burden of disease.

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Source

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Abstract

Few studies have attempted to quantify the integrated health burden, incorporating both mortality and morbidity as these factors pertain to air pollutants, on the population in the vicinity of the incinerators. The aims of this study are to estimate the attributable burden of disease caused by incinerators in Seoul, Korea and to present an approach based on source-specific exposure for the estimation of the environmental burden of disease (EBD). With particular attention on the development of a measurement means of the source-specific, exposure-based population attributable fraction (PAF), we integrated air dispersion modeling, Geographic Information Systems (GIS), the population distribution of exposure, and the exposure-response relationship. We then estimated the PAFs caused by additional concentrations of four air pollutants (PM(10), NO(2), SO(2), and CO) emitted from four municipal solid waste incinerators (MSWIs) in Seoul in 2007. We, finally, estimated the attributable burden of disease, using the estimated PAF and the disability-adjusted life years (DALY) method developed by the Global Burden of Disease Group of the World Health Organization (WHO). The PAF for NO(2) to all-cause mortality was assessed at approximately 0.02% (95% CI: 0.003-0.036%), which was the highest among all air pollutants. The PAFs for respiratory and cardiovascular disease were 0.12% (95% CI: 0.01-0.16%) and 0.10% (95% CI: 0.04-0.16%), respectively. The sum of the attributable burden of disease for four pollutants was about 297 person-years (PYs) (95% CI: 121-472 PYs) when the incinerators observed to the emission standards. The attributable burdens of respiratory disease and cardiovascular disease were about 0.2% and 0.1%, respectively, of the total burden of respiratory disease and cardiovascular disease of Seoul citizens for the year 2007. Although the air emissions from one risk factor, an incinerator, are small, **the burden of disease can be significant to the public health when population exposure is considered.**

<http://www.ncbi.nlm.nih.gov/pubmed/20677789>

Environ Sci Technol. 2010 Sep 1;44(17):6680-4. doi: 10.1021/es101244u.

Demonstration of thermal plasma gasification/vitrification for municipal solid waste treatment.

[Byun Y](#), [Namkung W](#), [Cho M](#), [Chung JW](#), [Kim YS](#), [Lee JH](#), [Lee CR](#), [Hwang SM](#).

Source School of Environmental Science and Engineering, Pohang University of Science and Technology (POSTECH), San 31 Hyoja-dong Nam-gu Pohang 790-600, Republic of Korea.

Abstract

Thermal plasma treatment has been regarded as a viable alternative for the treatment of highly toxic wastes, such as incinerator residues, radioactive wastes, and medical wastes. Therefore, a gasification/vitrification unit for the direct treatment of municipal solid waste (MSW), with a capacity of 10 tons/day, was developed using an integrated furnace equipped with two nontransferred thermal plasma torches. The overall process, as well as the analysis of byproducts and energy balance, has been presented in this paper to assess the performance of this technology. **It was successfully demonstrated that the thermal plasma process converted MSW into innocuous slag, with much lower levels of environmental air pollutant emissions and the syngas having a utility value as energy sources** (287 Nm³/MSW-ton for H₂ and 395 Nm³/MSW-ton for CO), using 1.14 MWh/MSW-ton of electricity (thermal plasma torch (0.817 MWh/MSW-ton)+utilities (0.322 MWh/MSW-ton)) and 7.37 Nm³/MSW-ton of liquefied petroleum gas. PMID: 20677789 [PubMed - indexed for MEDLINE]

<http://www.ncbi.nlm.nih.gov/pubmed/23062831>

Chemosphere. 2013 Feb;90(5):1658-63. doi: 10.1016/j.chemosphere.2012.08.062. Epub 2012 Oct 9.

Prevalence of low chlorinated dibenzo-p-dioxin/dibenzofurans in human serum. (dioxins and furans)

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Source

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Abstract

Mono- to tri-chlorinated dibenzo-p-dioxin/dibenzofurans (DD/Fs) have not been studied as extensively as the 17 toxic 2,3,7,8-substituted congeners. In this study for the first time, mono- to octa-chlorinated DD/Fs **were analyzed for seventy one human serum samples collected from incinerator workers as well as residents living near and far from the facility.** The mean concentrations of $\sum\text{Cl}(1-8)\text{DD/Fs}$ and 17-toxic congeners were 1890 and 398 pg g⁻¹ lipid (11.9 TEQ pg g⁻¹ lipid), respectively. 2,3,4,7,8-PeCDF, 1,2,3,7,8-PeCDD, and 1,2,3,6,7,8-HxCDD were predominant congeners that accounted for more than 78% of the TEQ concentrations. The profile for polychlorinated dibenzo-p-dioxins (PCDDs) was dominated by the most chlorinated congener, OCDD (>58%), while decreasing concentrations with increasing degree of chlorination were seen for polychlorinated dibenzofurans (PCDFs); MoCDFs (>83%) and DiCDFs (>6%). $\sum\text{Cl}(1-3)\text{DD/Fs}$ accounted for 77% of the serum concentrations of $\sum\text{Cl}(1-8)\text{DD/Fs}$. **These findings confirm that human beings are exposed to a large amount of $\sum\text{Cl}(1-3)\text{DD/Fs}$. Moreover, MoCDFs contributed more than 60% of the $\sum\text{Cl}(1-8)\text{DD/Fs}$ and was highly correlated with $\sum\text{Cl}(1-8)\text{DD/Fs}$.** Thus, 2-MoCDF could be a predictive indicator for $\sum\text{Cl}(1-8)\text{DD/Fs}$ ($r(s)=0.96$), and the combination of 2-MoCDF and OCDD could explain the 95.9% variation in the serum of $\sum\text{Cl}(1-8)\text{DD/Fs}$. These results suggest that low chlorinated DD/Fs should be studied extensively until these low chlorinated congeners will have been elucidated for their toxicities.

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Waste Manag. 2013 May 13. pii: S0956-053X(13)00173-6. doi: 10.1016/j.wasman.2013.04.004. [Epub ahead of print]

Mercury leaching characteristics of waste treatment residues generated from various sources in Korea.

[Cho JH](#), [Eom Y](#), [Park JM](#), [Lee SB](#), [Hong JH](#), [Lee TG](#).

Source

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Abstract

In this study, mercury (Hg) leaching characteristics of the waste treatment residues (fly ash, bottom ash, sludge, and phosphor powder) generated from various sources (municipal, industrial, medical waste incinerators, sewage sludge incinerator, oil refinery, coal-fired power plant, steel manufacturing plant, fluorescent lamp recycler, and cement kiln) in Korea were investigated. First, both Hg content analysis and toxicity characteristic leaching procedure (TCLP) testing was conducted for 31 collected residue samples. **The Hg content analysis showed that fly ash from waste incinerators contained more Hg than the other residue samples.** However, the TCLP values of fly ash samples with similar Hg content varied widely based on the residue type. Fly ash samples with low and high Hg leaching ratios (R_L) were further analyzed to identify the major factors that influence the Hg leaching potential. Buffering capacity of the low- R_L fly ash was higher than that of the high- R_L fly ash. The Hg speciation results suggest that the low- R_L fly ashes consisted primarily of low-solubility Hg compounds (Hg_2Cl_2 , Hg^0 or HgS), whereas the **high- R_L fly ashes contain more than 20% high-solubility Hg compounds ($HgCl_2$ or $HgSO_4$).**

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<http://www.ncbi.nlm.nih.gov/pubmed/20623053>

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J Environ Monit. 2010 Aug 5;12(8):1619-24. doi: 10.1039/c0em00004c. Epub 2010 Jul 9.

Size-resolved culturable airborne bacteria sampled in rice field, sanitary landfill, and waste incineration sites.

[Heo Y](#), [Park J](#), [Lim SI](#), [Hur HG](#), [Kim D](#), [Park K](#).

Source

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Abstract

Size-resolved bacterial concentrations in atmospheric aerosols sampled by using a six stage viable impactor at rice field, sanitary landfill, and waste incinerator sites were determined. Culture-based and Polymerase Chain Reaction (PCR) methods were used to identify the airborne bacteria. The culturable bacteria concentration in total suspended particles (TSP) was found to be the highest (848 Colony Forming Unit (CFU)/m³) at the sanitary landfill sampling site, while the rice field sampling site has the lowest (125 CFU/m³). The closed landfill would be the main source of the observed bacteria concentration at the sanitary landfill. The rice field sampling site was fully covered by rice grain with wetted conditions before harvest and had no significant contribution to the airborne bacteria concentration. This might occur because the dry conditions favor suspension of soil particles and this area had limited personnel and vehicle flow. **The respirable fraction calculated by particles less than 3.3 μ m was highest (26%) at the sanitary landfill sampling site followed by waste incinerator (19%) and rice field (10%),** which showed a lower level of respiratory fraction compared to previous literature values. We identified 58 species in 23 genera of culturable bacteria, and the *Microbacterium*, *Staphylococcus*, and *Micrococcus* were the most abundant genera at the sanitary landfill, waste incinerator, and rice field sites, respectively. An antibiotic resistant test for the above bacteria (*Micrococcus* sp., *Microbacterium* sp., and *Staphylococcus* sp.) showed that the *Staphylococcus* sp. had the strongest resistance to both antibiotics (25.0% resistance for 32 μ g ml⁻¹ of Chloramphenicol and 62.5% resistance for 4 μ g ml⁻¹ of Gentamicin). PMID: 20623053 [PubMed - indexed for MEDLINE]

<http://www.ncbi.nlm.nih.gov/pubmed/19058852>

Environ Int. 2009 Apr;35(3):580-7. doi: 10.1016/j.envint.2008.10.006. Epub 2008 Dec 5.

Dioxin and dioxin-like PCB profiles in the serum of industrial and municipal waste incinerator workers in Korea.

[Park H](#), [Ikonomou MG](#), [Kim HS](#), [Choi JW](#), [Chang YS](#).

Source

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Abstract

To assess occupational exposure, we determined the concentrations of PCDD/Fs and PCBs in human serum samples from 26 incinerator workers (10 industrial waste and 16 municipal solid waste incinerator workers), 38 residents near the facilities and 7 inhabitants (as control subjects) living over 10 km away from any incinerator facilities in Korea. The mean TEQ(WHO) levels of PCDD/Fs in the industrial and MSWI workers were 41.57 and 9.86 pg TEQ(WHO) g(-1) lipid, respectively. For the residents, the mean TEQ(WHO) was 13.47 pg TEQ(WHO) g(-1) lipid (residents near IWI, MSWI, and control subjects: 17.64, 13.31, and 6.91 pg TEQ(WHO) g(-1) lipid). Higher levels of certain PCDD/F congeners, mainly PCDFs, were detected in the serum of industrial incinerator workers in comparison to the levels measured in the residents. Significant differences were observed for PCDFs, the major compounds were OCDF, 1,2,3,4,6,7,8-HpCDF, and the minor components 1,2,3,4,7,8-HxCDF, 1,2,3,6,7,8-HxCDF, and 2,3,4,6,7,8-HxCDF ($p < 0.01$). The PCDD/F congener patterns and concentrations measured in the 71 serum samples examined suggest that the industrial incinerator workers were exposed to PCDD/Fs in the workplace, possibly through inhalation and/or skin contact. In contrast, the levels and congener patterns of PCBs measured were similar in all subjects, indicating that workers from the incinerator facilities examined were not subjected to additional exposure to these compounds.

PMID:19058852 [PubMed - indexed for MEDLINE]

<http://www.ncbi.nlm.nih.gov/pubmed/17695917>

Environ Sci Technol. 2007 Jul 1;41(13):4705-10.

Mechanistic relationships among PCDDs/Fs, PCNs, PAHs, CIPhs, and CIBzs in municipal waste incineration.

[Oh JE](#), [Gullett B](#), [Ryan S](#), [Touati A](#).

Source

Department of Environmental Engineering, Pusan National University, Pusan, Korea.

Abstract

An extensive investigation was conducted to understand polychlorinated dibenzo-p-dioxin and furans (PCDD/F) formation mechanisms and their relationship with other organic compounds. PCDD/F, chlorophenols (CIPhs), chlorobenzenes (CIBzs), polyaromatic hydrocarbons (PAHs), and polychlorinated naphthalenes (PCNs) were analyzed in the boiler exit gases of a field-scale municipal solid waste incinerator under various operating conditions. The TEQ value and the concentration of target compounds changed with incinerator operating conditions. Low mass PAHs and 246-triCIPh increased dramatically during shut downs; the latter was associated with increased 1368- and 1379-TeCDD. A strong correlation was observed between PCNs and PCDFs and adjacent PCNs homologue group were closely related to each other. This suggested that PCN formation is related with chlorination/ de-chlorination mechanisms similar to PCDFs. PCDDs were related with most of the CIPhs and the high chlorinated benzenes. Most of target compounds except PAHs had a positive correlation ($R^2 > 0.5$) with TEQ and half of them showed a good relationship ($R^2 > 0.8$) with PCDDs/Fs toxic equivalency (TEQ).

PMID: 17695917 [PubMed - indexed for MEDLINE]

<http://www.ncbi.nlm.nih.gov/pubmed/16788748>

Arch Environ Contam Toxicol. 2006 Oct;51(3):478-84. Epub 2006 Jun 20.

Risk factors affecting blood PCDDs and PCDFs in residents living near an industrial incinerator in Korea.

[Leem JH](#), [Lee DS](#), [Kim J](#).

Source

Department of Occupational Medicine, Inha University Hospital, 206-7 Third Street Shinheung-dong, Jung-ku, Incheon 400-103, Korea.

Abstract

The contamination sources of polychlorinated dibenzodioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs), such as industrial incinerators, can potentially change the blood levels and isomer patterns of PCDD/DFs in residents living near the incinerators. In this study, we estimated whether the blood levels and isomer patterns of PCDD/DFs in residents living near an incinerator were affected by its presence and investigated factors that characterize the risk of high exposure to PCDD/DFs in the area. **We estimated the blood levels and homologue patterns of PCDD/DFs in a group of 40 residents living within 5 km of an industrial incinerator and in a group of 20 residents living 20 km away from an incinerator.** We cannot assert that the operation of incinerator facilities was only cause of increased PCDD/DFs in these residents; however, the operation of incinerator facilities in agricultural areas increased PCDD/DF exposure to individuals. The group living next to the industrial incinerator especially represented the typical isomer pattern in which the proportions of OCDDs were lower and those of PCDFs higher than those in the other groups. The high-risk population with increased blood levels of PCDD/DFs included those who had lived longer in the contaminated area as well as those who frequently ate contaminated foods.

PMID: 16788748 [PubMed - indexed for MEDLINE]

<http://www.ncbi.nlm.nih.gov/pubmed/16325998>

J Hazard Mater. 2006 May 20;133(1-3):53-9. Epub 2005 Dec 1.

Concentration and congener patterns of polychlorinated biphenyls in industrial and municipal waste incinerator flue gas, Korea.

[Shin SK](#), [Kim KS](#), [You JC](#), [Song BJ](#), [Kim JG](#).

Source

National Institute of Environmental Research, Kyoungseo-dong, Seo-gu, Incheon, Korea.

Abstract

In the present study, individual PCB congeners were determined in the flue gases of 10 industrial and 5 municipal solid waste incinerators using HRGC/HRMS. The total PCBs concentration of all congeners (168 tetra to deca-chlorinated congeners) ranged from 26 to 343 ng/Nm³, and from 36 to 1095 ng/Nm³ in industrial waste incinerators (IWI) and municipal solid waste incinerators (MSWI), respectively. The total TEQ concentrations of PCBs, calculated using WHO-TEF values, varied from 0.001 to 0.55 ng-TEQ/Nm³ and from 0.001 to 8.29 ng-TEQ/Nm³ in the industrial waste incinerators and municipal solid waste incinerators, respectively. In all samples, the contribution of PCB 126 to total TEQ of PCBs was higher than 87%. The homologue pattern of PCBs in the incinerator flue gas samples was generally dominated by tetra- and penta-CBs. The distribution of other homologues was less than 15% in most of the incinerators. The fraction of co-PCBs against to total PCBs ranged from 1% to 19% and from 2% to 31% in IWI and MSWI flue gas samples. Results of the present study reveal that the presence of non-ortho PCB congeners in the flue gas originated from the combustion process.

PMID: 16325998 [PubMed - indexed for MEDLINE]

<http://www.ncbi.nlm.nih.gov/pubmed/15694479>

Chemosphere. 2005 Mar;58(11):1589-99.

A case study of dioxin monitoring in and around an industrial waste incinerator in Korea.

[Kim BH](#), [Lee SJ](#), [Mun SJ](#), [Chang YS](#).

Source

School of Environmental Science and Engineering, Pohang University of Science and Technology, San 31, Hyojadong, Namgu, Pohang 790-784, Korea.

Abstract

Many studies have been conducted that monitor and trace the sources of polychlorinated dibenzo-p-dioxin/furans (PCDD/Fs) by comparing congener patterns of environmental samples with those of possible sources. **In this study, we measured PCDD/F concentrations and compared congener patterns of samples of various media found in and around an industrial waste incinerator in Korea**, including stack gas, fly ash, bottom ash, ambient air, soil, pine needle, and human blood. **We obtained reliable data on the relationship between the PCDD/F distributions in these sources and the environment**, and thus found indicators with which to assess the impact of such sources on the surrounding environment. **In addition, the difference between the levels of PCDD/Fs in the blood of short-term workers and long-term workers demonstrates that these workers are exposed to the compounds produced by the indicator.**

PMID: 15694479 [PubMed - indexed for MEDLINE]

<http://www.ncbi.nlm.nih.gov/pubmed/15589248>

Sci Total Environ. 2005 Jan 5;336(1-3):45-56.

Concentrations of polybrominated diphenyl ethers, polychlorinated dibenzo-p-dioxins and dibenzofurans, and polychlorinated biphenyls in human blood samples from Korea.

[Kim BH](#), [Ikonomou MG](#), [Lee SJ](#), [Kim HS](#), [Chang YS](#).

Source

School of Environmental Science and Engineering, Pohang University of Science and Technology, San 31 Hyojadong, Namku, Pohang 790-784, Republic of Korea.

Abstract

Analysis of blood samples is an effective way of evaluating contamination by persistent pollutants such as polybrominated diphenyl ethers (PBDEs), polychlorinated dibenzo-p-dioxin/furans (PCDD/Fs), and polychlorinated biphenyls (PCBs) in human population. Concentrations of PBDEs, PCDD/Fs and PCBs were measured in the blood of laborers (n = 13) working full time in two different **municipal waste incinerator (MWI) plants** and residents from the general population (n = 22) living in areas near MWIs in Korea. The concentrations of PBDEs were found to be slightly higher in the blood of incineration workers (8.61-46.05 ng/g lipid; mean, 19.33 ng/g lipid; median, 15.94 ng/g lipid) in comparison to that of residents from the general population (7.24-28.89 ng/g lipid; mean, 15.06 ng/g lipid; median, 14.34 ng/g lipid). The total average PCDD/Fs and PCB TEQ concentration was 20.11 pg/g lipid, averaged over incineration workers (17.73 pg/g lipid) and the general population (21.52 pg/g lipid). In addition, the average total **crude concentration of PCDD/Fs was 7.40 ng/g lipids, which was 4.1 times greater than for PBDEs.** Congener specific analysis confirmed that BDE 47 was a predictive indicator for total PBDE concentration (correlation coefficient r = 0.912), and that PCB 153 was a predictive indicator for total PCB concentration (r = 0.967). **The PBDE levels in human blood in Korea are much higher than those reported in other countries.** The presence of the BDE 183 congener was characteristic in the blood of workers from an electronic dismantling facility in MWIs.

PMID:15589248 [PubMed - indexed for MEDLINE]

<http://www.ncbi.nlm.nih.gov/pubmed/15298188>

Environ Sci Technol. 2004 Jul 15;38(14):3820-6.

Influence of an industrial waste incinerator as assessed by the levels and congener patterns of polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans.

[Park S](#), [Kim SJ](#), [Kim KS](#), [Lee DS](#), [Kim JG](#).

Source

Environmental Planning Institute, Graduate School of Environmental Studies, Seoul National University, Seoul 151-742, Korea.

Abstract



To assess the spatial change in the influence of an industrial waste incinerator, a total of 47 soil samples (**in continuous manner with distance**) and 65 human blood samples (40 within 5 km and 20 at 7 and 12 km) were analyzed for polychlorinated dibenzo-p-dioxins/polychlorinated dibenzofurans (PCDD/Fs). The influence was not clearly observed both on the soil and blood levels of PCDD/Fs as the levels in the near zone (within 5 km) were not statistically different from those in the far zones at 7 and 12 km. Assessment was conducted on the congener patterns by using principal component analysis and by characterizing the congener fractions as a function of distance. In soil, the congener fractions of 2,3,4,7,8-PeCDF, 1,2,3,4,7,8-HxCDF, 1,2,3,6,7,8-HxCDF, 1,2,3,4,6,7,8-HpCDF, and OCDF decreased progressively with the distance. Blood was consistent with soil in that each congener fraction of these PCDFs (except OCDF) was statistically greater in the near zone than the far zones. The decreases in these PCDFs were balanced by OCDF in both soil and blood. **It was concluded that although not obviously observed in the contamination levels, the influence of the incinerator was clearly shown by the congener patterns of PCDD/Fs in both soil and blood that changed with distance.**

PMID:15298188 [PubMed - indexed for MEDLINE]

<http://www.ncbi.nlm.nih.gov/pubmed/15152666>

[J Air Waste Manag Assoc.](#) 2002 Jan;52(1):69-75.

Levels and characteristic homologue patterns of polychlorinated dibenzo-p-dioxins and dibenzofurans in various incinerator emissions and in air collected near an incinerator.

[Oh JE](#), [Chang YS](#), [Ikonomou MG](#).

Source

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Abstract

Polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/Fs) were monitored in stack gas and fly ash of **various Korean incinerators and in air samples collected near the facilities**. Concentrations of PCDD/Fs in emissions were investigated, and characteristic PCDD/F homologue patterns were classified using statistical analyses. The PCDD/F emission levels in stack gas and fly ash samples from small incinerators (SIs) were higher than those from municipal solid waste incinerators (MSWIs). The PCDD/F concentrations ranged between 0.38 and 1.16 pg I-TEQ/m³ (21.2-75.2 pg/m³) in ambient air samples. The lower-chlorinated furans were the dominant components in most of the stack gas and fly ash samples from SIs, although this was not the case for fly ash from MSWIs. **This homologue pattern is consistent with other studies reporting a high fraction of lower-chlorinated furans in most environmental samples affected by incinerator emissions, and it can be used as an indicator to assess the impact of such facilities on the surrounding environment.**

PMID: 15152666 [PubMed - indexed for MEDLINE]

<http://www.ncbi.nlm.nih.gov/pubmed/12916748>

[Ind Health.](#) 2003 Jul;41(3):181-8.

Health survey on workers and residents near the municipal waste and industrial waste incinerators in Korea.

[Leem JH](#), [Hong YC](#), [Lee KH](#), [Kwon HJ](#), [Chang YS](#), [Jang JY](#).

Source Department of Occupational Medicine, Inha University, 7-206 Shin heung dong, Jung-gu, Incheon, Republic of Korea.

Abstract Hazardous substances, such as polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) also have been detected in Municipal Solid Waste (MSW) and industrial waste incinerators in Korea. **In this study, we estimated the exposure status of these**

hazardous substances and their health effects in workers and residents near the MSW incinerators and residents near the industrial waste incinerators. We interviewed 13 workers and 16 residents from the area around the two MSW incinerators, and further 10 residents from the area around one industrial waste incinerator, which is suspected to emit higher hazardous substances. During the interview we collected information including sociodemographic information, personal habits, work history, detailed gynecologic and other medical history. Blood samples from 45 subjects were also collected for analysis of PCDDs and PCDFs, which were analyzed by HRGC-HRMS (High Resolution Gas Chromatography-High Resolution Mass Spectrometer). In addition to a questionnaire survey, urinary concentrations of 8-hydroxydeoxyguanosine (8-OH-dG) and malondialdehyde (MDA) were measured as oxidative injury biomarkers. Urinary concentrations of 8-OH-dG were determined by in vitro ELISA (JAICA, Fukuroi, Japan). MDA were determined by HPLC using adduct with TBA (thiobarbituric acid). The PCDD/F concentrations in residents from the area around industrial waste incinerator were higher than those in workers and residents from the area around MSW incinerator. The average toxic equivalency (TEQ) concentrations of PCDD/Fs in residents from the area around industrial waste incinerator were 53.4 pg I-TEQs/g lipid. The average TEQ concentrations of PCDD/Fs in workers and residents near MSW incinerator were 12.2 pg I-TEQs/g lipid. Estimated daily intake (EDI) of each person was calculated, and the EDI of all workers and residents near MSW incinerator were within the tolerable daily intake range. But for only 30% of 10 people near the industrial waste incinerator were the EDI within the tolerable daily intake range (1-4 pg I-TEQ/kg bw/day) suggested by WHO (1997). The oxidative stress of residents near the industrial waste incinerator was higher than that in workers and residents from the area around MSW incinerator. This oxidative stress may have been caused by hazardous substances, such as PCDD/Fs emitted by incinerators. The residents from the area around industrial waste incinerator were exposed to hazardous substances such as PCDD/Fs. Proper protection strategies against these hazardous chemicals are needed.

PMID: 12916748 [PubMed - indexed for MEDLINE]

<http://www.ncbi.nlm.nih.gov/pubmed/12322740>

Environ Sci Technol. 2002 Sep 1;36(17):3700-5.

Concentrations and profiles of polychlorinated dibenzo-p-dioxins and dibenzofurans in soils from Korea.

[Im SH](#), [Kannan K](#), [Giesy JP](#), [Matsuda M](#), [Wakimoto T](#).

Source

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Abstract

Soil samples were collected from Changwon and Masan Cities, Korea, and analyzed for polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDDs/DFs). Nearly all tetra- through octachlorinated PCDDs/DFs including the 17 2,3,7,8-substituted PCDDs/DFs were detected in all samples. Total concentrations of PCDDs/DFs and of 2,3,7,8-tetrachlorinated dibenzo-p-dioxin (TeCDD) equivalents (TEGs) in soils ranged from 35 to 121,400 pg/g, dry weight, and from 0.2 to 3720 pg of I-TEQ/g, respectively. On the basis of guidelines for TEQ concentrations established in Germany and the United States, 9 of 23 soil samples (39% of the total samples analyzed) could not be expected to pose human health hazards. The rest of 61% of soils need measures such as investigations of source identification, soil decontamination, and/or soil removal. **Total concentrations of PCDDs/DFs were greater at or near four industrial sites, which are concerned with the steel industry, petrochemical-related industry, and industrial waste incineration, than other areas.** This indicates the presence of potential source areas. Soil collected from a site 50 m from an open-burning industrial waste incinerator in an industrial complex was heavily contaminated, containing a total concentration of PCDDs/DFs of 121,400 pg/g, dry weight. **PCDDs/DFs were also detected in soils from the top of a 200 m mountain indicating a wide dispersal of**

PCDDs/DFs by atmospheric transport from point source areas. The congener pattern and relative proportions of PCDFs in soils suggest that commercial PCB preparations such as Kanechlors may be one of the sources. The wide range of PCDD/DF isomers detected in soils from many locations also suggests a multitude of sources, in addition to commercial PCBs, such as incineration of industrial wastes such as car tires, scrap wires, plastics, papers, and emission of automobile exhaust.
PMID: 12322740 [PubMed - indexed for MEDLINE]

<http://www.ncbi.nlm.nih.gov/pubmed/11372892>

Chemosphere. 2001 May-Jun;43(4-7):985-7.

PCDD and PCDF exposures in workers and controls living near an industrial waste incinerator.

[Kim Y](#), [Yang SH](#), [Kim M](#), [Shin DC](#).

Source

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Abstract

This study measured the levels of 17 congeners of PCDDs/PCDFs in serum to compare the levels **between potentially exposed workers at an industrial waste incinerator and any residents with no known exposures**. The 1,2,3,6,7,8- and 1,2,3,7,8,9-HxCDD were detected in serum of workers but in controls. Likewise, 1,2,3,7,8-PeCDF, 1,2,3,6,7,8- and 1,2,3,7,8,9-HxCDF were detected only in serum of workers. **The international toxic equivalent (TEQ) levels of PCDDs/PCDFs in sera of workers are much higher than in controls**. Among PCDDs, the proportion of total concentration and TEQ level is dominated predominantly by 1,2,3,6,7,8- and 1,2,3,7,8,9-HxCDD. We need extensive studies to estimate human exposure and are continuing this investigation.
PMID: 11372892 [PubMed - indexed for MEDLINE]

<http://www.ncbi.nlm.nih.gov/pubmed/22954398>

Inhal Toxicol. 2012 Sep;24(11):741-50. doi: 10.3109/08958378.2012.716869.

Subacute inhalation toxicity assessment of fly ash from industrial waste incinerators.

[Shim I](#), [Oh E](#), [Yang S](#), [Ryu T](#), [Soh J](#), [Sul D](#), [Kim P](#).

Source

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Abstract

Fly ash from industrial waste incinerators has been a significant concern because of their constituent toxic heavy metals and organic compounds. The objective of this study was to identify the subacute inhalation toxicity of fly ash from industrial waste incinerators, using whole body inhalation exposure chambers. Male and female groups of Sprague-Dawley rats were exposed to fly ash by inhalation of concentrations of 0, 50, 100, 200 mg/m³, for 6 h/day, 5 days/week for 4 weeks. There was no significant difference in body weight, and relative organ weight to body weight, between the exposure groups and the control group. **Hematological examinations revealed a significant increase of monocyte counts in fly ash exposed rats and brown pigment laden macrophage was found in the lungs of rats exposed to high concentration of fly ash.** A decrease of blood glucose levels and an increase in glutamate oxaloacetate transaminase activity were observed in fly ash treated rats. **There was also a significant increase of lactate dehydrogenase levels in rat blood exposed fly ash. A significant dose-dependent increase of DNA damage was found in lymphocytes, spleen, bronchoalveolar lavage, liver, lung, and thymus of rats exposed to fly ash.** In addition, the level of lipid peroxidation was increased in the plasma of rats exposed to a high concentration of fly ash. These results suggest that **inhalation of fly**



ash from industrial waste incinerators can induce histopathologic, hematological, and serum biochemical changes and oxidative damage.

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