

Sabato 10 novembre, ore 9.30

presso il Centro Culturale Aldo Moro, via Traversagna 4 – Cordenons (PN)

si terrà l'incontro:

GLI INCENERITORI DEL PORDENONESE CONTAMINANO IL TERRITORIO?

Conoscere per vivere in modo consapevole

Programma

Intervengono:

Dr. Federico Grim, *biologo:*

7 anni di analisi e 21 polli fuorilegge: l'inquinamento da furani, diossine e PCB nel maniaghese

Prof. Mauro Tretiach, *docente di Biomonitoraggio ambientale, Università di Trieste:*

Attività industriali e inquinamento da mercurio a Spilimbergo

Prof. Roberto Fornasier, *già titolare della cattedra di Chimica organica, Università di Padova:*

a lettura della problematica pordenonese alla luce del caso cementificio "Rossi" di Pederobba

Ing. Franco Sturzi, *direttore Scientifico ARPA FVG:*

I risultati del campionamento dei suoli nel maniaghese

Prof. Pierluigi Barbieri, *docente di Valutazione del rischio chimico, Università di Trieste:*

Integrare informazione analitica per comprendere processi ambientali, supportare decisioni, comunicare

Moderà:

Giorgio Simonetti – Giornalista professionista, La Città-Pordenone

gno:
GENERITORI DEL PORDENONESE CONTAMINANO IL
TORIO? Conoscere per vivere in modo consapevole



UNIVERSITÀ DEGLI STUDI DI TRIESTE

Dipartimento di Scienze Chimiche e Farmaceutiche

***INTEGRARE INFORMAZIONE ANALITICA
PER COMPRENDERE PROCESSI AMBIENTALI,
SUPPORTARE DECISIONI, COMUNICARE***
ovvero «*come ragiona un chimico ambientale per
comprendere fenomeni e proporre verifiche e soluzioni*»

PIERLUIGI BARBIERI

Dipartimento di Scienze Chimiche e Farmaceutiche , Università degli Studi di Trieste,

Via L. Giorgieri 1, 34127 Trieste

**barbierp@units.it*

Sabato 10 novembre

Centro Culturale Aldo Moro

via Traversagna 4 – Cordenons (UD)

Pierluigi Barbieri

Prof. Ass. SSD CHIM/12, Chimica dell'Ambiente e dei Beni Culturali

Dipartimento di Scienze Chimiche e Farmaceutiche, Università degli Studi di Trieste

Presidente dell'***Ordine dei Chimici e dei Fisici del Friuli Venezia Giulia***

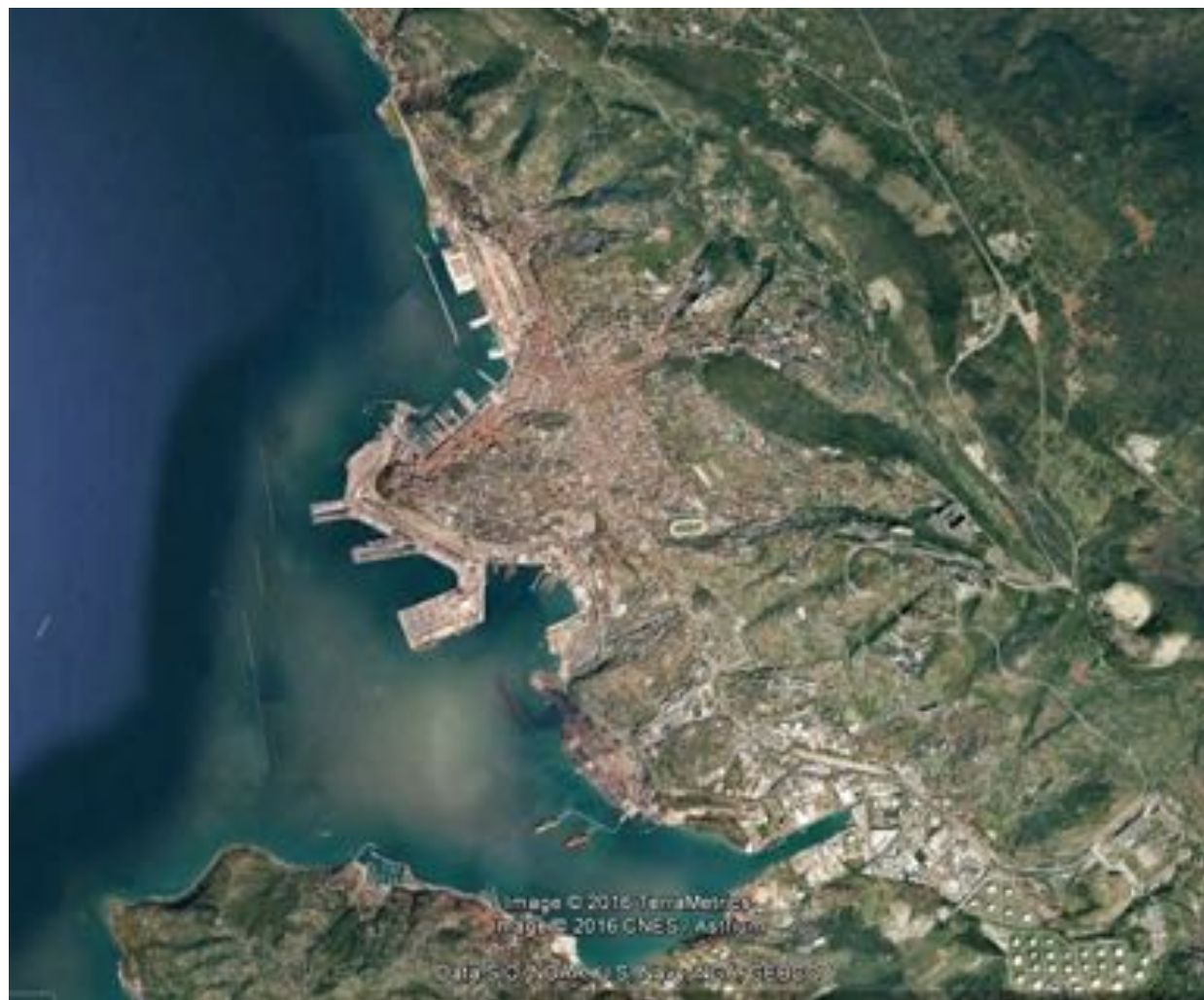
Rappresentante di UNITS nel ***Comitato Scientifico di ARPA FVG***

Consulente del Sindaco di Trieste per Inquinamento e Chimica dell'Ambiente
Componente Gruppo tecnico-scientifico per problematiche di ***inquinamento da sostanze odorigene del Comune di Roma***

Esperto UNI presso ***CEN/TC264/ WG2 e WG41***

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Già ***CTU per Procura*** della Repubblica presso il Tribunale di Trieste (4 procuratori)



caso in questione:

GLI INCENERITORI DEL PORDENONESE
CONTAMINANO IL TERRITORIO? Conoscere
per vivere in modo consapevole

Identificata nel maniaghese presenza di polli
contaminati da PCDX e PCB



2018/1
**Chicken's
POPS**
MANIAGO / CAMPAGNA / FANNA
FEDERICO GRIM

**USO DEGLI ANIMALI DA
CORTILE (GALLINE OVAIOLE) COME
BIOMARKERS DELLA
CONTAMINAZIONE DA
POPS (DIOSSINE,
FURANI E POLICLOROBIFENILI)**

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Polli e contaminazione da POPs clorurati E' argomento «nelle mie corde»?

UNIVERSITÀ DEGLI STUDI DI TRIESTE

XXI Ciclo del
Dottorato di Ricerca in
Metodologie di biomonitoraggio dell'alterazione ambientale

... sul bioaccumulo di microinquinanti organici
inorganici tramite *Mytilus galloprovincialis*
in prossimità di un sito costiero contaminato

Chimica dell'Ambiente e dei Beni Culturali

...
Capriglia

Coordinatore del Collegio dei Docenti
Chiar.mo Prof. Mauro Tretiach
Università degli Studi di Trieste

Relatore
Dr. Pierluigi Barbieri
Università degli Studi di Trieste



CMAA 2006 Mediterranean Meeting
Multivariate Analysis and Chemometrics Applications in Environmental and Cultural Heritage, Nemi
(RM), Italy, Europe, 2-4 October 2006

How Useful Classical Chemometrical Approaches Can Be In Environmental Assessment? A Case Study About Source Identification for Dioxin and Furans in an Urban-Industrial Coastal Area

P. Barbieri¹, P. Busetto², L. di Monte¹, P. Plossi¹

¹Dipartimento di Scienze Chimiche, Università di Trieste, Via Giorgieri 1, 34127 Trieste, Italy
²Funzione Ecologia e VIA - Provincia di Trieste, Via Sant'Anastasio 3, 34100 Trieste, Italy

Abstract

Data about presence of dioxins and furans from different types of atmospheric powders, soils, industrial emissions and ash - were collected in the coastal urban - industrial area around the city of Trieste (NE-Italy) in order to identify fingerprints of industrial sources and hierarchical cluster analysis techniques, as principal component analysis and hierarchical cluster analysis, were used in order to identify fingerprints of industrial sources and to highlight differences within industrial processes generating such pollutants and possible

GLI INQUINANTI oggetto di studio

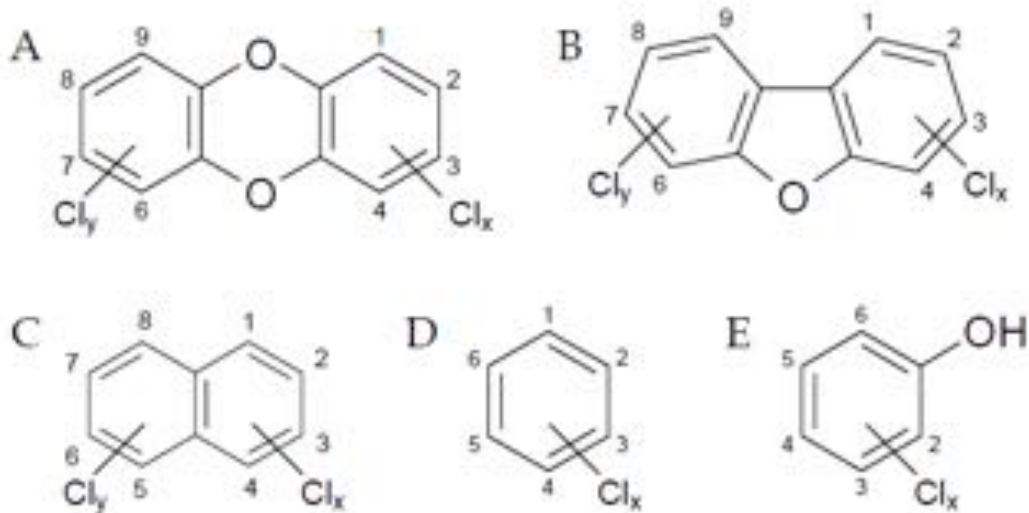


Figure 1. Generalized structural formula and substitution positions PCDF (B), PCN (C), PCBz (D), and PCPh (E).

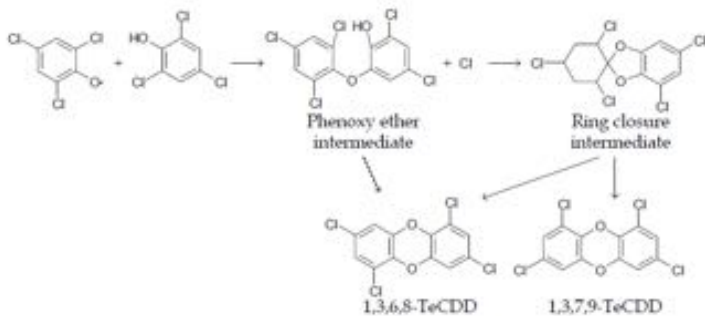


Figure 4. The chlorophenol condensation pathway exemplified by condensation of two 2,4,6-TrICPh entities (radical/molecule). Adapted from Sidhu et al. (63).

Formazione da precursori

Thermal Formation and Chlorination of Dioxins and Dioxin-Like Compounds - <https://www.diva-portal.org/smash/get/diva2:142298/FULLTEXT01.pdf>

Sintesi «de novo»

Rilevanza dei processi in fase eterogenea (superfici metalliche, post-combustione (T relativamente b

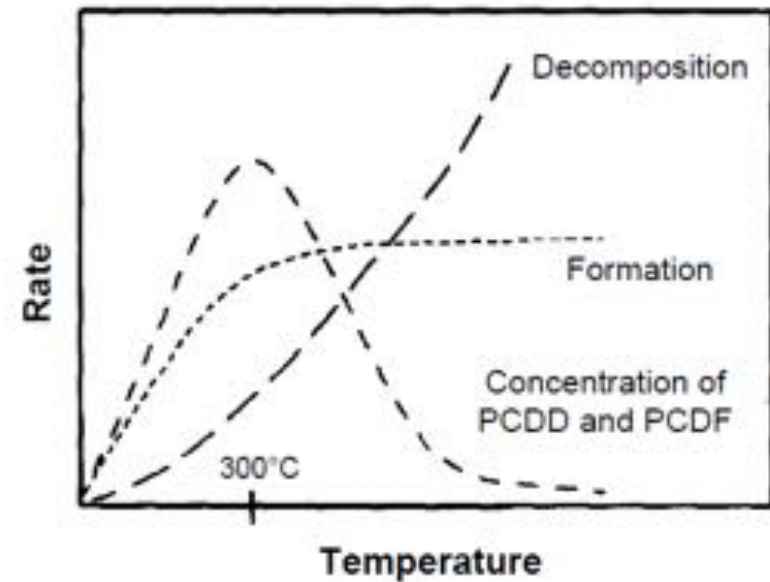


Figure 3. The competing behaviour of formation and decomposition of PCDD and PCDF. Adapted from Wehrmeier et al. (47).

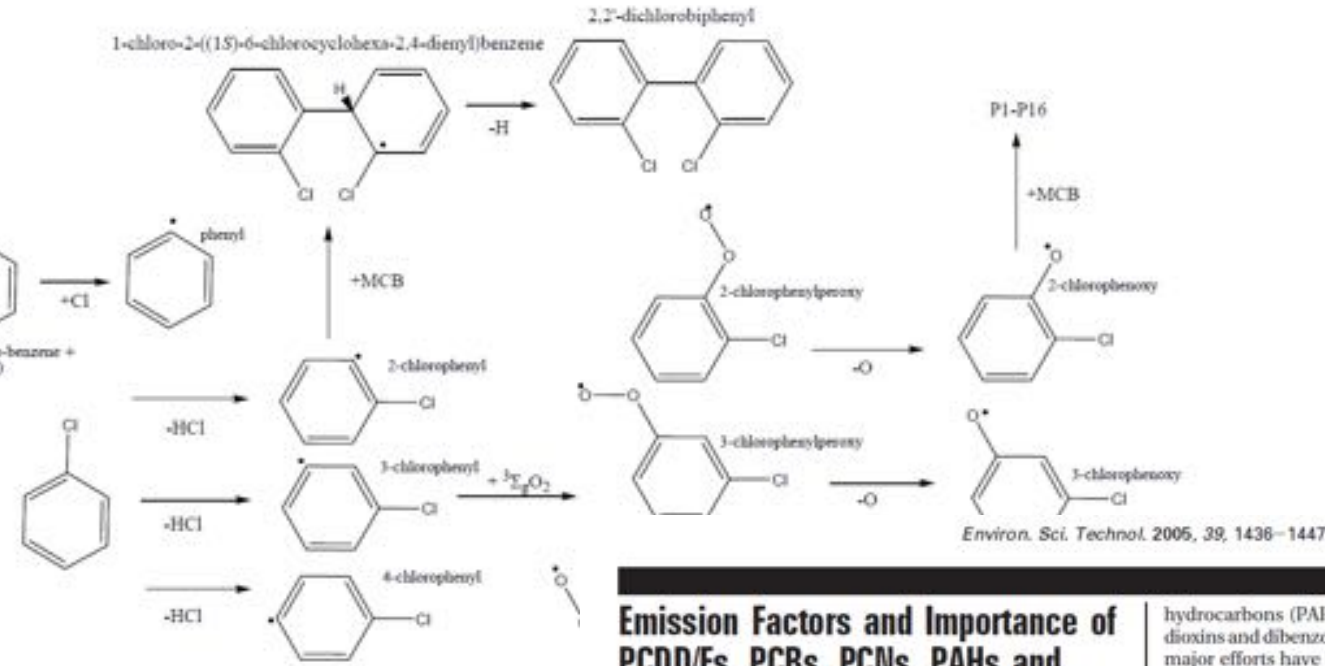


FIGURE 1. Schematic diagram of the reaction pathway of chlorobenzene

nessattezza nello studio
 rim : PCB si formano
 e in combustioni «non
 striali», di residui
 coli e domestiche

Emission Factors and Importance of PCDD/Fs, PCBs, PCNs, PAHs and PM₁₀ from the Domestic Burning of Coal and Wood in the U.K.

ROBERT G. M. LEE,¹ PETER COLEMAN,¹
 JOANNE L. JONES,¹
 KEVIN C. JONES,¹ AND
 RAINER LOHMANN^{2,3,4,5}

¹Department of Environmental Science, IENS, Lancaster University, Lancaster LA1 4YQ, U.K., ²National Environmental Technology Centre, AEA Technology plc, Harwell, Didcot, Oxfordshire OX11 0QJ, U.K., and ³Research Center for Ocean Margins (RCOM), University of Bremen, P.O. Box 330440, D-28334 Bremen, Germany

This paper presents emission factors (EFs) derived for a range of persistent organic pollutants (POPs) when coal and wood were subject to controlled burning experiments, designed to simulate domestic burning for space heating. A wide range of POPs were emitted, with emissions from coal being higher than those from wood. Highest EFs were obtained for particulate matter, PM₁₀ (~ 10 g/kg fuel) and polycyclic aromatic hydrocarbons (~ 100 mg/kg fuel for ΣPAHs). For chlorinated compounds, EFs were highest for polychlorinated biphenyls (PCBs), with polychlorinated naphthalenes (PCNs), dibenzo-p-dioxins (PCDDs) and dibenzofurans (PCDFs) being less abundant. EFs were on the order of 1000 ng/kg fuel for ΣPCBs, 100s ng/kg fuel for ΣPCNs and 100 ng/kg fuel for ΣPCDD/Fs. The

hydrocarbons (PAHs) dioxins and dibenzofurans major efforts have been made to reduce the use of lead-free petrol. The use of PAHs and PCDD/F have mostly focused on the use of lead-free petrol and medical solid waste (e.g. refs 1-3). A relative importance scale sources to the scale has increased in recent years. Emissions from domestic burning have increased in recent years. Source inventory estimates to the UK crude figures for dioxin emissions are attached.

One form of difficulty for PCDD/Fs and PM₁₀ from wood for residential sphere emissions from domestic burning to contribute to emissions (2) and between emissions annually, emitted by domestic burning because of the difficulty of deriving emission factors for different fuel type/combustion conditions. Recently, careful studies have shown that other pollutants (PCBs) and naphthalene (PCNs) and identified in waste incineration and PCN-concentrations in past industrial production are almost no published and difficult to estimate.

Emission of PCDD/F, PCB, and HCB from Combustion of Firewood and Pellets in Residential Stoves and Boilers

BJÖRN HEDMAN,^{1,2}
 MORGAN NÄSLUND,¹ AND
 STELLAN MARKLUND¹

¹Unit of Biomass Technology and Chemistry, Swedish University of Agricultural Sciences, P.O. Box 4097, SE-904 03 Umeå, Sweden, and ²Chemistry Department, Environmental Chemistry, Umeå University, SE-901 87 Umeå, Sweden

To assess potential emissions of polychlorinated dibenzo-p-dioxins (PCDDs), polychlorinated dibenzofurans (PCDFs), polychlorinated biphenyls (PCBs), and hexachlorobenzene (HCB) from residential combustion of biofuels, experiments were performed in which various types of pellets and firewood were combusted in four types of stoves and boilers, with both full and reduced rates of air supply. Intermittent combustion of wood pellets resulted in emissions of 11 ng-(WHO-TEQ)/kg combusted fuel (dry weight). A modern, environmentally certified boiler yielded somewhat lower

of emissions from a national survey of unorganised organic pollutants (POPs) government (J), including combustion of biofuels. Concentrations of dioxin reported in terms of toxic equivalent concentration. Two of the equivalent methods are scales. The latter scale is a toxicity. Because of high resulting value of merely 10-20% higher in this scale not clearly stated (as in the denomination "TEQ" is). In comparison to emissions from combustion, literature reports on biofuel combustion are dioxin emissions from residential combustion of biofuels, experiments reported that residential emissions of 0.7 ng (I-TEQ)/m³ (emissions kg) from uncontaminated wood (waste wood) were in addition, in a series of appliances, Hübner et al. reported 2.6 ng (TEQ)/MJ and 0.0 emissions of wood, woodchip, respectively. Assuming a

AN EMISSION BUDGET FOR DIOXINS FROM CROP AND BUSH FIRES IN AUSTRALIA.

Meyer, CP¹, Black, RR², Tolhurst, KG³, McCaw⁴, L, Cook⁵, G, Symons, R⁶ and Mueller, JF².

¹ CSIRO Atmospheric Research, Aspendale Vic., ² EnTox, University of Queensland, Brisbane ³ University of Melbourne, Creswick, Vic., ⁴ DEC, Manjimup, Western Australia, ⁵ CSIRO Sustainable Ecosystems, Darwin, ⁶ NMI, Sydney

Abstract

Previous inventory estimates of dioxins (PCDD), furans (PCDF) and dioxin-like PCB emissions from bushfires in Australia have been limited by the small number of published estimates of emission rates. However, the situation has been improved by a recent field study that measured emission factors for PCDD, PCDF and PCBs from 20 prescribed fires, wildfires and sugar cane fires across Australia. These data are used in a revised inventory methodology that also accounts for uncertainties in inventory activity data and parameters. Incorporating these new data into an emissions budget indicates a new best estimate for Australia's PCDD, PCDF and PCB emissions from open burning in 1994 of 142 g TEQ with an uncertainty range of 31g to 494g TEQ which is 70% lower than the previous estimate. Forest fires and crop residue burning accounted for 8% of total emissions with the remainder occurring in savanna woodlands of northern Australia. Total emissions increased by 70% between 1990 and 2001 to 229 g, due entirely to increased fire activity in the savanna woodlands.

Volatilità, solubilità, partizione in fasi organiche (mobilità) sono molto variabili per i POPs clorurati

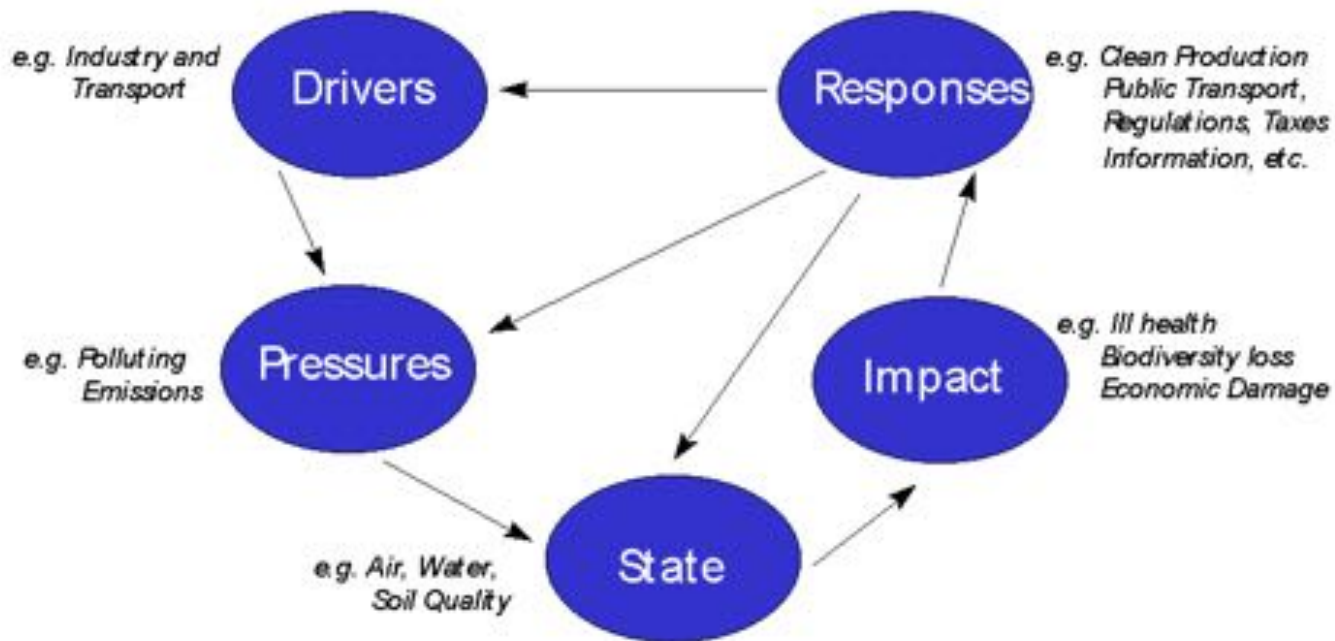
Table 1
Physico-chemical properties for selected PCDD/Fs^a

	TEF ^b	p_L (Pa)	S (mg/m ³)	log K_{ow}	H (Pa m ³ /mol)	log K_{oa}
1-CDD	0	0.075	417	4.75	6.288	7.34
2,3,7,8-TCDD	1	$1.18 \cdot 10^{-4}$	0.0193	6.80	3.337	9.67
OCDD	0.001	$9.53 \cdot 10^{-7}$	0.000074	8.20	0.684	11.8
2,8-CDF	0	$1.46 \cdot 10^{-2}$	14.5	5.44	6.377	8.03
2,3,4,7,8-PCDF	0.5	$1.72 \cdot 10^{-5}$	0.236	6.5	0.505	10.2
OCDF	0.001	$1.01 \cdot 10^{-7}$	0.00116	8.0	0.191	12.1

^aSubcooled liquid pressure (p_L), water solubility (S), octanol–water partition coefficient (K_{ow}), Henry-constant (H) and octanol–air partition coefficient (K_{oa}), from Mackay et al. (1991) determined for 25°C.

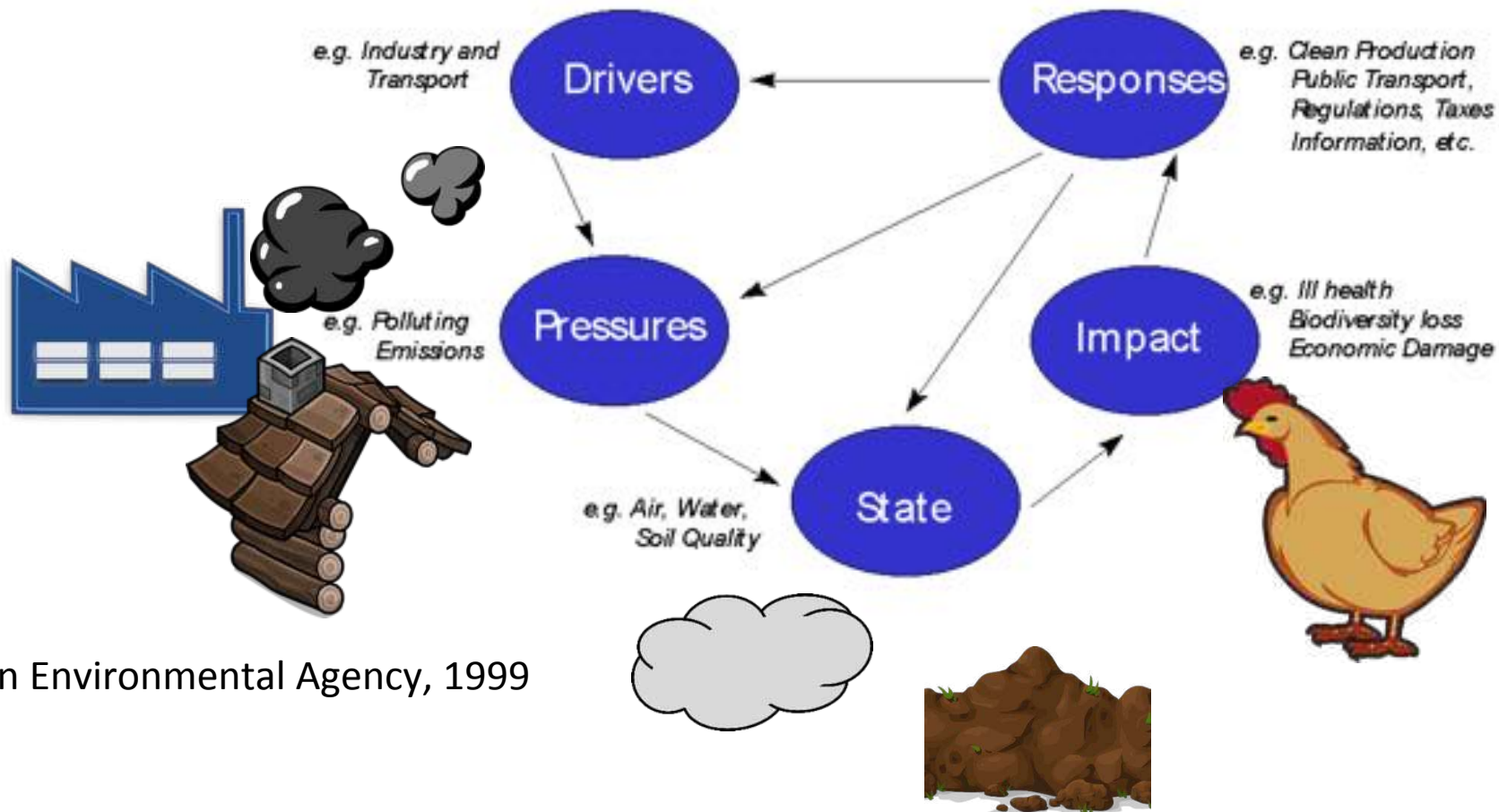
^b1-TEF from Kutz et al. (1990).

Lo schema DPSIR per le relazioni sulla qualità ambientale



European Environmental Agency, 1999

Lo schema DPSIR per le relazioni sulla qualità ambientale



European Environmental Agency, 1999

ma della sperimentazione (dei monitoraggio)...

Sintesi delle conoscenze disponibili

Ricerca nella letteratura scientifica

Modello concettuale del fenomeno

oggetto di studio

*(al meglio della conoscenza disponibile,
quali sono gli elementi da tenere in
considerazione, quali le relazioni tra di essi,
quale la significatività delle stesse)*

ACCUMULO NEI POLLI
 NELLE UOVA
 PRINCIPALMENTE
 TRAVERSO INGESTIONE

Review

Contamination of free-range chicken eggs with dioxins and dioxin-like polychlorinated biphenyls

Greet Schoeters¹ and Ron Hoogenboom²

¹University of Antwerp and VITO, Environmental Toxicology, Mol, Belgium

²RIKILT, Institute of food safety, Wageningen, The Netherlands

Dioxins and dioxin-like (DL) polychlorinated biphenyls (PCB) are persistent organic pollutants that enter the body mainly by food intake. A small margin exists between current exposure levels in the human population and the levels causing biological effects. Therefore, stringent control of concentrations of these contaminants in food and feed is needed. Eggs from free-range chicken are increasingly becoming an important part of the diet. These eggs have a higher risk of being contaminated with increased levels of dioxins and DL-PCB than barn or cage eggs. Ingestion of soil particles from environmentally contaminated areas may contribute to elevated dioxin levels in free-range chicken eggs. Available data show that current soil levels of dioxins and DL-PCB in residential and agricultural areas in Europe often appear to be too high to produce free-range eggs with dioxin levels below the current limit values in the EU. On the other hand, polychlorinated dibenzo-p-dioxins/polychlorinated dibenzofurans concentrations in eggs from free-range chicken are not necessarily above the limit values. Contamination levels in soil should be kept low and should be controlled in areas with free foraging chicken although all modifying factors that influence uptake of dioxins and PCB from the environment and transfer into eggs are yet not well understood.

Keywords: Chicken eggs / Food contamination / Polychlorinated dibenzo-p-dioxins / Polychlorinated dibenzofurans / Polychlorinated biphenyls

ingimi contaminati

contaminati
 agente contaminante
 (tra attiva? Storica?)





Science for Environment Policy

Egg consumers may be exposed to dioxins above EU limit due to farmyard PCP

Chickens foraging on soils containing environmental pollutants can accumulate these chemicals in their tissues and eggs. This study assessed levels of dioxins in eggs produced in Poland, in some cases finding concentrations several times above the safe EU limit. The researchers identified the source as preservative-treated wood in the chicken coop, which they say is a public health risk.

Most chemicals in food are beneficial – carbohydrate, fat and protein are all composed of chemical compounds. However, some synthetic chemicals in food can be harmful. Substances that persist in the environment and accumulate up the food chain are of particular concern, including dioxins.

Dioxin is a catch-all term used to describe a large group of toxic chemicals, including polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs). Dioxins are by-products of industrial processes and are particularly dangerous because of their ability to accumulate in the fatty tissue of animals. Prolonged exposure, even at very low doses, can damage the immune, hormonal and reproductive systems and may even cause cancer.



08 April 2016
Issue 452

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Source: Piskorska-Pliszczynska, J., Strucinski, P., Mikolajczyk, S., Maszewski, S., Rachubik, J. & Pajurek, M. (2016). Pentachlorophenol from an old henhouse as a dioxin source in eggs and related human exposure. *Environmental Pollution*, 208: 404–412. DOI:10.1016/j.envpol.2015.10.007

Asbestos cement cover plates (ACP) such as Eternit and so other many brands may also be matter of concern for the environment due to possible PCB oil (Arocolor) surface coating (probably to enhance

FORUM delle ASSOCIAZIONI
tutela dei "MAGREDI del CELLINA" del Friuli Venezia Giulia



Piazzi di coperture in eternit, materiale contenente cemento e amianto, sono state scattate sul greto del Tormenta-Covera e del Cellina durante lo svolgimento

Environment International 80 (2015) 72–78

Contents lists available at ScienceDirect



Environment International

journal homepage: www.elsevier.com/locate/envint

Full length article

High levels of dioxin-like PCBs found in organic-farmed eggs caused by coating materials of asbestos-cement fiber plates: A case study

Jörg Winkler

Landesbetrieb Heutisches Landeslabor, Am Versuchsfeld 11-13, 34128 Kassel, Germany

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Keywords:
Asbestos-cement plates
dl-PCB
PCDD/F
DR-CALUX® bioassay
Organic-farmed eggs

ABSTRACT

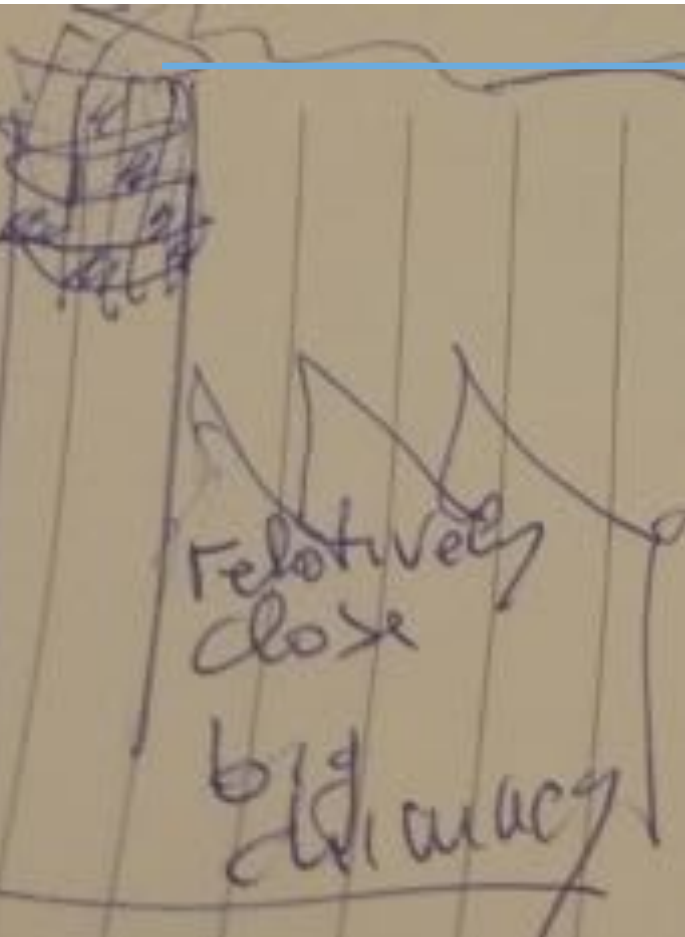
During a regional monitoring project of organic-farmed, free-range and cage-free eggs, high levels of dioxin-like PCBs were detected in organic-farmed eggs, using the dioxin responsive chemical-activated luciferase gene expression (DR-CALUX®) bioassay. Further evaluations performed with GC-HRMS (gas chromatography-mass spectrometry) revealed elevated amounts of non-dioxin-like (ndl) polychlorinated biphenyls (PCBs) dominated by most lipophilic congeners like PCB 138, 153 and of dioxin-like (dl) PCBs, with a congener pattern in the descending order of PCB 118, 156, 167, 105, 110, 105, 126 and PCB 77. Contaminations with polychlorinated dibenzo-p-dioxins (PCDDs) appeared of minor importance, with only hepta- and octa-substituted dioxins above their limits of quantification (LOQs). The polychlorinated dibenzofurans (PCDFs) was dominated by low amounts of tetra- and penta-chlorinated congeners. To identify the source of contamination, several samples of organic-farmed eggs, soil, laying hens, and corrugated asbestos-cement cover plates (ACPs), stable dust and debris collected in the gutter of the stable were analyzed. Comparing PCB congener-pattern of individual samples, the source was traced back to the ACPs, which covered roof and sidewalls of the stable. Because coating materials probably have been used for roofing and cladding in many countries worldwide, there is a high probability that the presented case report describes a local incident but rather describes a new source of PCB contamination, yet widely unknown or under-researched.

Memo No.
Date

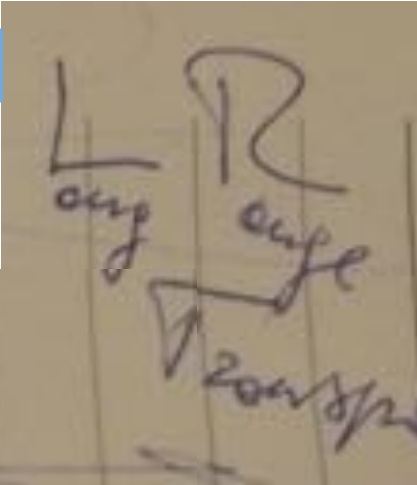
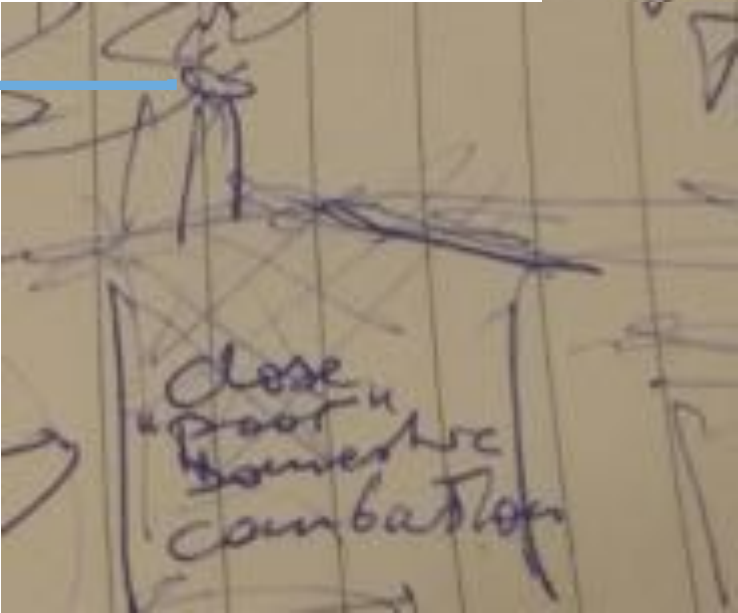


**PCB su Eternit?
PCP?**





Polveri totali sospese (includono le depositabili. **se** contaminate **allora** sorgente contaminante attiva!)



Suoli contaminati
(sorgente contaminante ancora attiva? Storica?)

**PCB su Eternit?
PCP?**



~~Mangimi contaminati~~



possiamo attualmente dire che la contaminazione rilevata venga da emissioni industriali/inceneritori?

possiamo dire che abbiamo fonti inquinanti **attive** che emettono contaminanti persistenti?

qual'è la priorità per rispondere alla questione?

Rilevare microinquinanti nelle deposizioni



Atmospheric depositions of persistent pollutants: methodological aspects and values from case studies

Maetano Settimo and Giuseppe Viviano

Dipartimento di Ambiente e Connessa Prevenzione Primaria, Istituto Superiore di Sanità, Rome, Italy

Abstract

Deposition monitoring, already in use by government control organizations of various countries, contributes to an important increase in experimental knowledge on pollutant deposition fluxes, on their environmental fate and on the possible effects on human health.

At the European level, the necessity to consider with extreme attention the environmental contamination due to deposition, has brought to adopt a series of legislative measures and recommendations; this has contributed to set up environmental surveillance systems and monitoring campaigns for a series of pollutants which may accumulate in the environment as persistent organic pollutants (POPs) and for metals.

More recently, with DL.vo 155/2010, the necessity to consider, in the development of monitoring stations, the possibility to detect also data on deposition rates which represent a non-direct exposure of the population through the food chain. For sampling the decree considers only two types of depositions: for total deposition (bulk and Bergerhoff) and wet only deposition.

Key words

- air quality
- monitoring
- legislation deposition
- metals
- persistent organic pollutants

In regione abbiamo «almeno un» caso di **inquinamento diffuso** (Trieste);
in termini generali viviamo in ambienti in cui è presente contaminazione,
anche «storica». **Non dobbiamo solo proteggere l'ambiente, ma costruire qualità
ambientale, e delineare linee guida per gestire le situazioni di inquinamento diffuso**

<https://www.youtube.com/watch?v=SzH3AZghQ6o&feature=share> 6.00-7.40



II WORKSHOP
**Ricerca e servizi: i siti inquinati nel Sistema Nazionale
per la Protezione dell'Ambiente (SNPA)**
ROMA, 22 febbraio 2017
Auditorium MATTM • via Capitan Bavastro, 180 - Roma

Standardizzazione, confronto e accordo,
controllo reciproco,
trasparenza

fondamenta per una gestione credibile
Del territorio

自 IO
他 ALTRI
共 INSIEME
榮 PROGRESSO

GRAZIE!

BARBIERP@UNITS.IT

