

# Research based information to involved bodies on health risks during unloading of transport units;

key information extracted from fumigation incidences and from existing research on fumigants, VOCs and other hazardous materials

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# Selected studies on containers

Study	Place of study	Year of study	Pesticide conc.	VOCs conc.	Origin	Cargo
Knol-de Vos, 2003. RIVM-report	Rotterdam	2002	x		x	x
de Groot, 2007. RIVM-report	Netherlands	2003-2006	x			
Baur et al., 2010. Occup. Environ. Med.	Hamburg	2006	x	x	x	x
Svedberg and Johanson, 2011 IMM-report.	Gothenburg	2011 ?	x	x		
Frost, 2010. Conf. present. WCO, Cairo	Australia	2007-2008	x			
Luyts, 2010. Conf. presentation, Brussel	BeNeLux	2010	x			
Wagstaffe et al., 2012 Report Safe Work Australia	Australia	2012	x	x	1)	x

1) Only info that most containers were from China

# Highest obs. concentration, ppm (% cont. w/pesticide > OEL NL)

Study	H <sub>2</sub> CO	CH <sub>3</sub> Br	PH <sub>3</sub>	CCl <sub>3</sub> NO <sub>2</sub>	Total no. containers
Netherlands 2002	13.4 (13.2)	90 (2.0)	> 20 (8.3)	-	303
Netherlands 2003-6	-	> 15.8 (13.4)	-	0.29	46
Germany 2006	ca 30	ca 1000	36000	-	2113
Belgium 2010	40 (2.2)	88 (0.6)	368 (0.8)	26 (0.14)	51174
Australia 2012	2.3 (21.1)	4.4 (21.1)	0.2 (1.3)	1.6 (5.3)	76
IDLH (NIOSH), ppm	20	250	50	2	
OEL NL, ppm	0.1	0.25	0.1	0.1	

# Summary of 7 studies

- Differentiate between pesticides and chemicals from goods
- Highest toxic potential from residual pesticide
- Pesticides – acute toxicity – may be fatal
- Phosphine ( $\text{PH}_3$ ) - high risk potential – only pesticide applied in solid form – risk of solid residues and high concentration at opening
- Formaldehyde most frequently found
- No consistent distribution of pesticides between types of cargo - except phosphine in foodstuffs
- VOCs in lower levels, less risk of acute effects

# Possible actions

- Mandatory labelling of fumigated containers
- Ventilation prior to opening and discharging
- Use of PPE when indicated
- Verification studies: pesticide residues
- Focus on main compounds (formaldehyde, phosphine, methylbromide, chloropicrin)
- VOCs during discharge – long-term effects ?
- Exposure monitoring of workers for VOCs during discharge



# RESEARCH BASED INFORMATION ?

## Contents in information;

- **Why fumigation**
- **Agens/products/goods**
- **Health hazards**
- **Preventive measures**

## Present knowledge?

- Any differentiation and/or time trends in fumigation; cargo, agens, countries of origin ?
- Is this valid/representative also for Norway/Scandinavia?
- Personal exposure vs. concentrations in containers?

## Target groups;

- employers and workers organizations, authorities, costums, occupational health services,...

## Type of information;

- Leaflets, brochures, web-site, articles...