

Annex III

Information on transformation of pentachlorophenol to pentachloroanisole and proposal by Japan to fill information gaps

1. The following information was submitted by the group of friends of the Chair on pentachlorophenol and its salts and esters during the Committee's seventh meeting. The information was extracted from the original publications used to develop section 3 of document UNEP/POPS/POPRC.7/INF/5/Add.1.

I. Summary of available information on transformation of pentachlorophenol to pentachloroanisole in different environmental and experimental conditions

Conversion of PCP to PCA (%)	Temp. (°C)	pH	OC (%)	Species	Incubation period	Source	Remark
Aerobic condition							
51.5%		7.5	2.3		24 d	Murthy <i>et al.</i> , 1979	
14%	22 to 10	4	38	<i>Phanerochaete chrysosporium</i>	46 d	Lamar <i>et al.</i> , 1990a	
9%	22 to 10	4	38	<i>Phanerochaete sordida</i>	46 d	Lamar <i>et al.</i> , 1990a	
80% (estimated from figure 8 of the article)				<i>Mycobacterium</i>	48 h	Haggblom <i>et al.</i> , 1988	Sludge with the presence of degradation inhibitor that favoured the methylation of PCP
50% (estimated from figure 8 of the article)				<i>Rhodococcus</i>	48 h	Haggblom <i>et al.</i> , 1988	Sludge with the presence of degradation inhibitor that favoured the methylation of PCP
Only trace amounts (< 0.1 %)		5.8	1.8	<i>Trametes versicolor</i>	42 d	Tuomela <i>et al.</i> , 1999	
Levels of PCP and PCA are approximately the same (see below)	During summer in Chile				5 months	Mardones <i>et al.</i> , 2009	Field study
PCA was the major biotransformation product				<i>Lentinula edodes</i>	10 weeks	Okeke <i>et al.</i> , 1997	Sterilized and non-sterilized soils
64%	30	6.4	3.55	<i>Phanerochaete chrysosporium</i>	21 d	Lamar <i>et al.</i> , 1990b	
71%	30	6.4	3.55	<i>Phanerochaete sordida</i>	21 d	Lamar <i>et al.</i> , 1990b	
68%	30	7.7 (decreased to 3.1)		<i>Phanerochaete chrysosporium</i>	28 d	Walter <i>et al.</i> , 2004	Liquid culture experiment
Traces of PCA	30	7.7 (decreased to 3.1)		<i>Trametes versicolor</i>	28 d	Walter <i>et al.</i> , 2004	Liquid culture experiment

Conversion of PCP to PCA (%)	Temp. (°C)	pH	OC (%)	Species	Incubation period	Source	Remark
Up to 82%	37	4.3		<i>Phanerochaete chrysosporium</i>	12 d	Badkoubi <i>et al.</i> , 1996	Liquid culture experiment
Anaerobic condition							
5.3%		7.5	2.3		24	Murthy <i>et al.</i> , 1979	

2. Most of the above studies have been conducted under experimental conditions using specific pentachlorophenol preferential bacteria or fungi under conditions that do not necessarily represent environmental conditions.

3. Two studies reflect the conversion process of pentachlorophenol to pentachloroanisole in the field:

(a) Murthy *et al.* 1979 (1,14):

- (i) Aerobic and anaerobic conversion of pentachlorophenol to pentachloroanisole was examined using silty clay loam;
- (ii) Under aerobic conditions, 50 per cent of pentachlorophenol was converted to pentachloroanisole;
- (iii) Under anaerobic conditions, 5 per cent of pentachlorophenol was converted to pentachloroanisole;
- (iv) Conversion of pentachloroanisole was greater in aerobic than in anaerobic soils;
- (v) It should be noted that some interconversion of pentachloroanisole and pentachlorophenol occurred in both aerobic and anaerobic soil.

(b) Mardones *et al.* 2009 (7):

- (i) Conversion of pentachlorophenol to pentachloroanisole was examined using pentachlorophenol contaminated sawdust and soil in the field;
- (ii) Pentachlorophenol was added to soil samples at the mg/kg level. After five months, concentrations of pentachlorophenol and pentachloroanisole were 10 and 5 µg/kg, respectively.
- (iii) It is important to note, however, that no monitoring of the volatilization of pentachloroanisole, known to be a volatile metabolite to pentachlorophenol, was performed.

II. Information gaps identified by Japan and proposal for experiments and monitoring to fill them

4. Interested parties are invited:

(a) To initiate experiments under conditions relevant to the environment;

(b) To collect monitoring data on pentachlorophenol and pentachloroanisole, in particular from pentachlorophenol-contaminated sites, as such data could provide information on what happens in the environment under actual conditions.

5. Such experiments and compilation of monitoring data should be initiated without delay so that they can be taken into account by the Committee at its eighth meeting.