



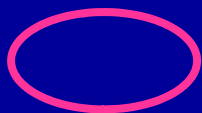
Progress Report: Hazardous Substances from Open Burning of Waste in Developing Countries

**Joint project by:
UNEP/DTIE Chemicals Branch
Tsinghua University, China
CENICA / INE, Mexico
Umeå University, Sweden
EPA, U.S.A.**

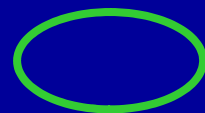


Toolkit Sub-category 6(b)

Classification		Emission Factors – $\mu\text{g TEQ/t}$ of Material Burned				
		Air	Water	Land	Product	Residue
1.	Landfill fires	1,000	ND	600	NA	[600]
2.	Accidental fires in houses, factories	400	ND	400	NA	[400]
3.	Uncontrolled domestic waste burning	300	ND	600	NA	[600]
4.	Accidental fires in vehicles	94 (per vehicle)	ND	18 (per vehicle)	NA	[18 (per vehicle)]
5.	Open burning of wood (construction/demolition)	60	ND	10	NA	[10]



EF_{PCDD/PCDF} addressed



EF_{PCDD/PCDF} alternative

New EFs for dl-PCB (TEQ), PCB₇ and HCB



Outputs

- **Sound methodology for future projects to determine driving parameters for emission factors for the subcategory of open burning of waste (in developing countries);**
- **Emission factors for open waste burning in relation to waste composition and burning parameters;**
- **First emission factors/unintentional POPs results from open burning of waste in developing countries;**
- **Experience in developing countries to design studies for determination of emission factors and capacity to determine them analytically;**
- **Experiences in developing countries on communication of scientific results and implementation of BEP measures.**



Main Activities in the Project

1. **Waste characterization in all four countries (fractions of waste that actually burn);**
2. **Site visits to waste dumps for consideration of sampling in the field study;**
3. **Burn hut experiments of shredded waste in Swedish (05/2008) and US burn huts (02/2008);**
4. **Field sampling in China and Mexico (10-11/2008);**
5. **Determination of emission factors to improve the Toolkit (03/2009);**
6. **Stakeholder workshops and diffusion of project and its results**
(1st series: MEX-04/2008, CHN-05/2008
2nd series: MEX-03/2009, CHN-04/2009
Side event at COP4 ?).



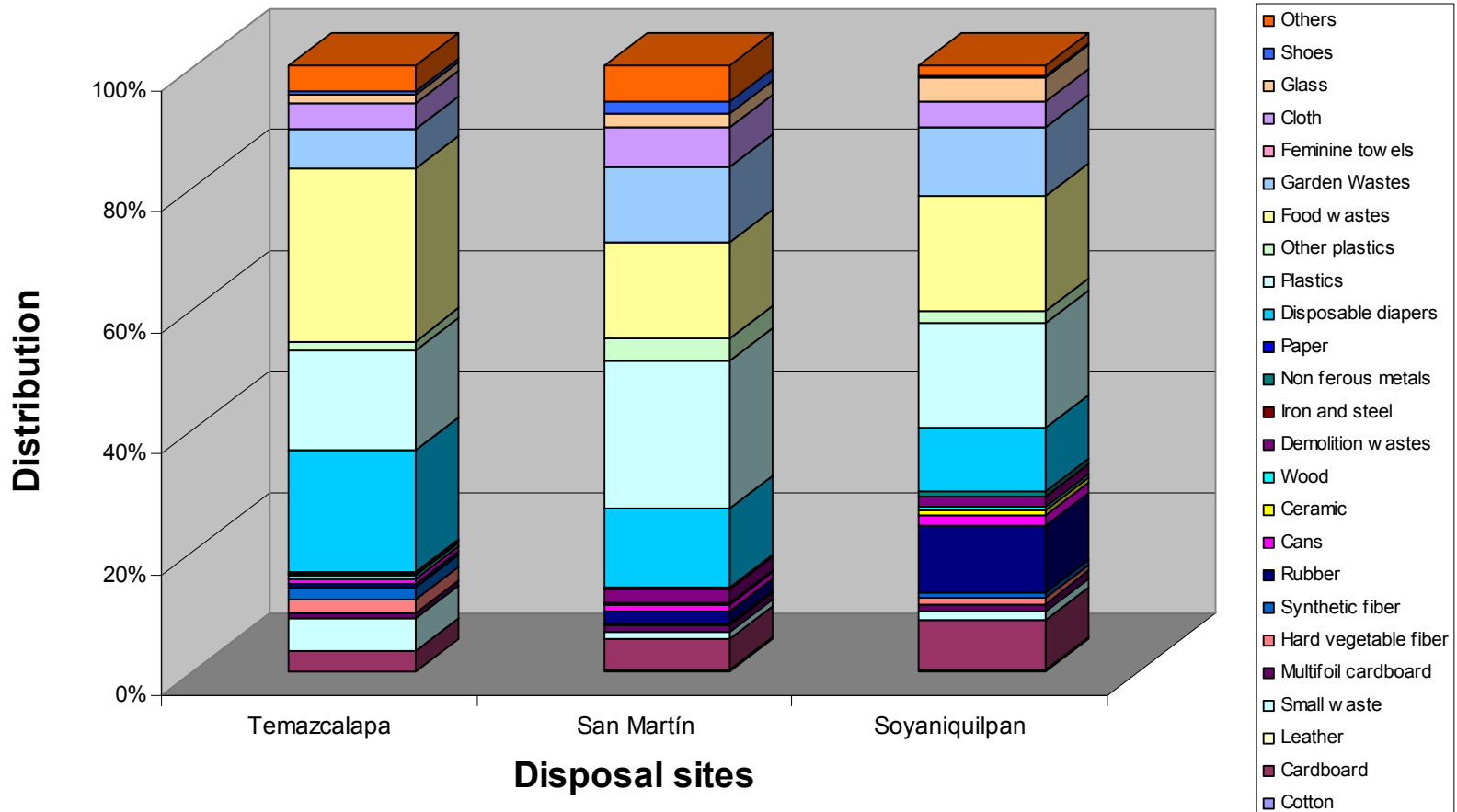
No.	Urban zones		Semi-urban zones		Rural zones	
	composition	Percentage (w)	composition	Percentage (w)	composition	Percentage (w)
1	Dust	5	Dust	20	Dust	38
2	Kitchen waste	50	Kitchen waste	48	Kitchen waste	40
3	Plastics	16	Plastics	10	Plastics	5
	Soft	10	Soft	6.5	Soft	3.5
	Hard	6	Hard	3.5	Hard	1.5
4	Paper	16	Paper	10	Paper	4.5
	Paper packages	2	Paper packages	2	Paper packages	1
	Uncoated	9	Uncoated	5	Uncoated	2.5
	Coated	5	Coated	3	Coated	1
5	Metal	2	Metal	2	Metal	1
6	Glass	2	Glass	1	Glass	1
7	Textile	2	Textile	2	Textile	2
8	Rubber	2	Rubber	1	Rubber	1
9	Disposable diapers/Feminine napkins	0.5	Disposable diapers/Feminine napkins	0.5	Disposable diapers/Feminine napkins	0
10	Others	4.5	Others	5.5	Others	7.5
	Leaves	2	Leaves	2.5	Leaves	3
	Wood	1	Wood	1	Wood	2
	Ceramic	1	Ceramic	1	Ceramic	1
	Brickbat	0.5	Brickbat	1	Brickbat	1.5

Chinese Waste Compositions



Mexican Waste Composition

Wastes ditribution by site





Experimental and Analysis

- 16 burn hut experiments in Umeå + 12 burns in RTP;
- Burn hut experiments done in duplicate;
- Mexico/USA/Sweden: one waste composition
China: three waste compositions (urban, semi-urban, rural);
- Swedish and US waste burned to allow correlation with earlier published results;
- Cross-over samples in burn huts to be analyzed;
- 2-times five field samplings in each, Mexico and China
High-vol sampler designed;
- Evaluation of data:
 - (a) Burn hut experiments shredded waste $\Rightarrow$ importance of fractions/chemical composition
 - (b) Field samples $\Rightarrow$ importance of physical conditions





Field Sampling Plan

China

1. Urban – small site + small site with concrete walls/no roof
2. Semi-urban – small + small site with concrete walls/no roof
3. Rural

Mexico (weighting before and after burn)

1. Rural site
2. Urban-industrial
3. Semi-urban
4. Semi-urban as delivered at landfill
5. Urban-industrial with e-waste added

















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WebSite for project:

http://www.chem.unep.ch/pops/pcdd_activities/projects/default.htm