

Quality improvement of MSWI bottom ash: possibilities of input management

J. Steketee, Tauw bv

M. Timmerije & J. van Aalten, AVR bv

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Tauw

Introduction

- Possibilities input management
 1. Achieving stable process conditions
 2. Identification and exclusion of highly contaminated waste streams
 3. Optimization of the macro composition of the bottom ash
 4. Achieving a good conversion of organic matter
 5. Influencing the distribution of elements about bottom ash, fly ash and flue gas



Incineration experiments

- Three full scale experiments, AVR plant, Duiven
 - IW: Industrial waste (industries and sorting plants)
 - HH: Household waste
 - HH/CW: 50/50 mix from household waste and commercial waste (offices, shops et cetera)
- Burning of 160 tons of waste during 8 hours
- Sampling of bottom ash and fly ash



Incinerator plant AVR Duiven



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Waste is heterogeneous.....

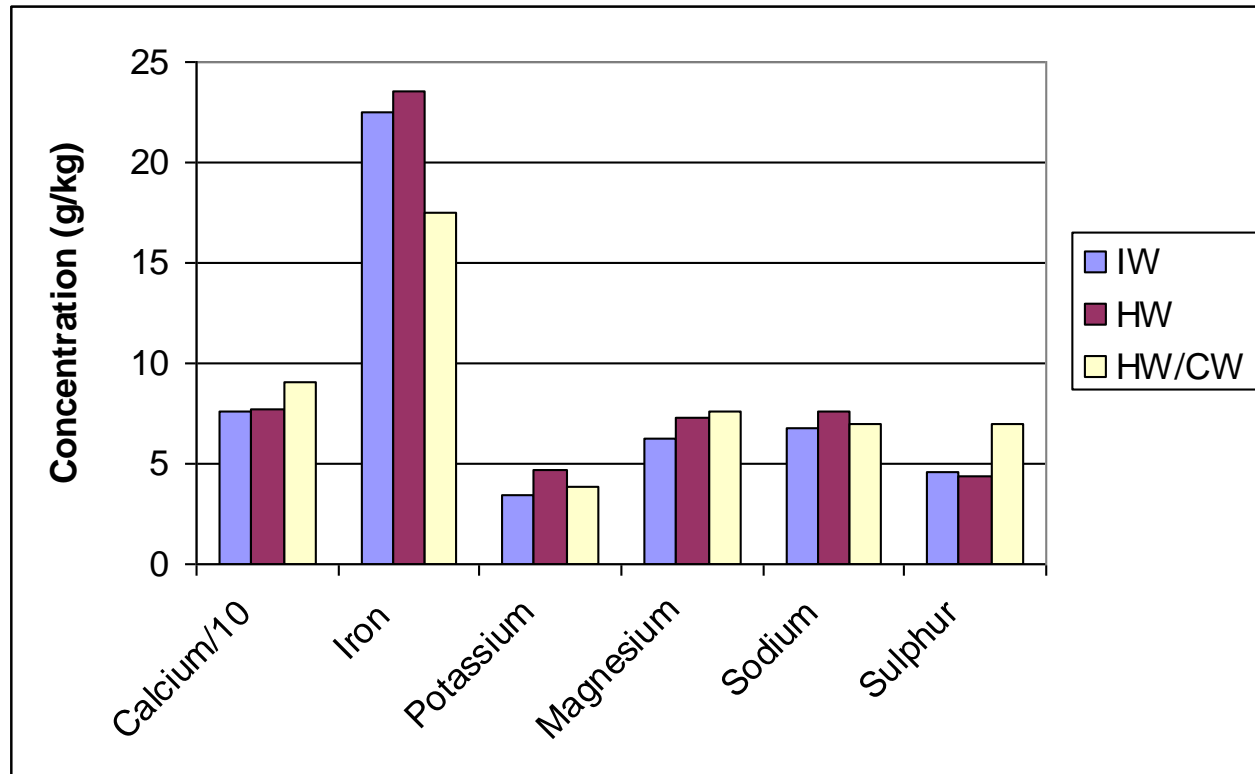


Parameters and methods

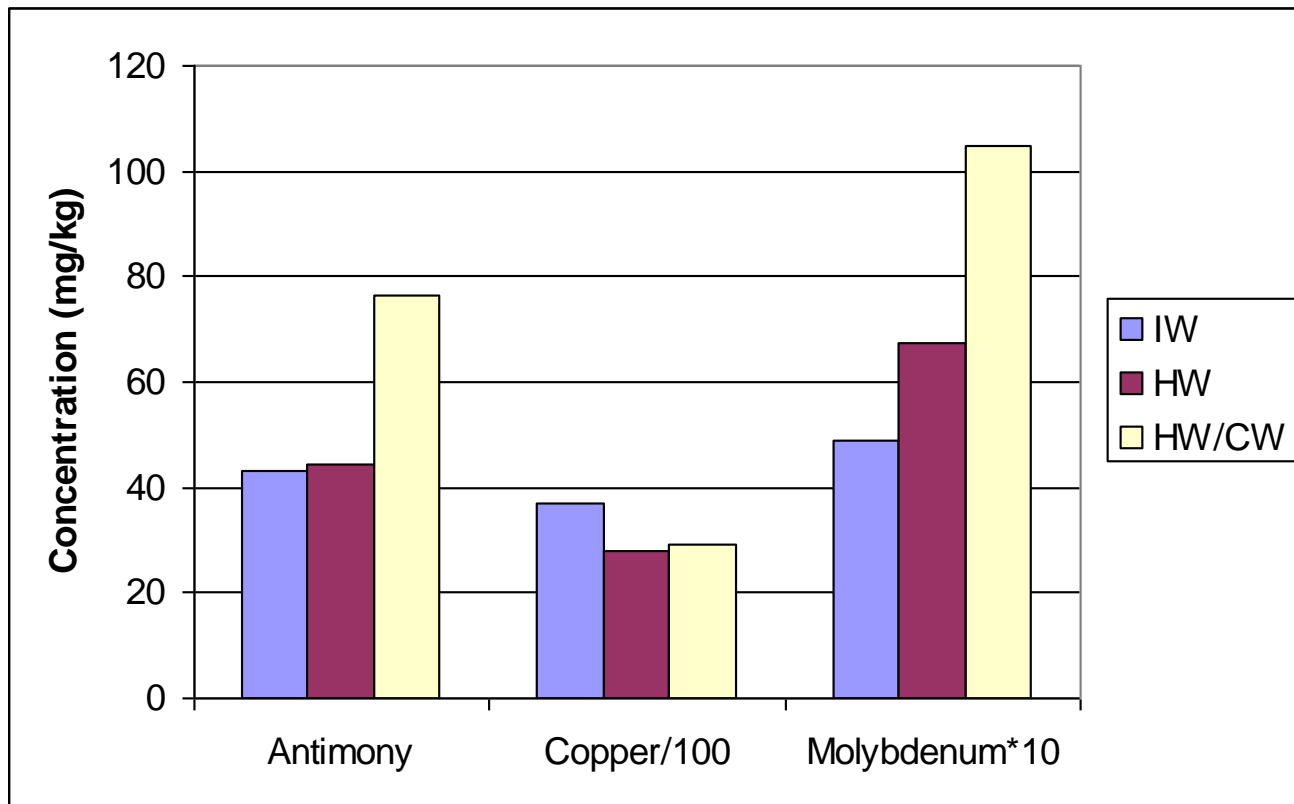
- Elemental composition (metals after digestion with aqua regia)
- Leaching in column, batch and pH-stat tests
- DOC: availability and speciation (extractions with water and 0.1 N NaOH, separation in humic acids, fulvic acids, hydrophobic neutral organic matter and hydrophilic acids)
- Iron and aluminum (hydr)oxides (extraction with ascorbate, dithionite, oxalate)
- Buffer capacity (titration with HCl)



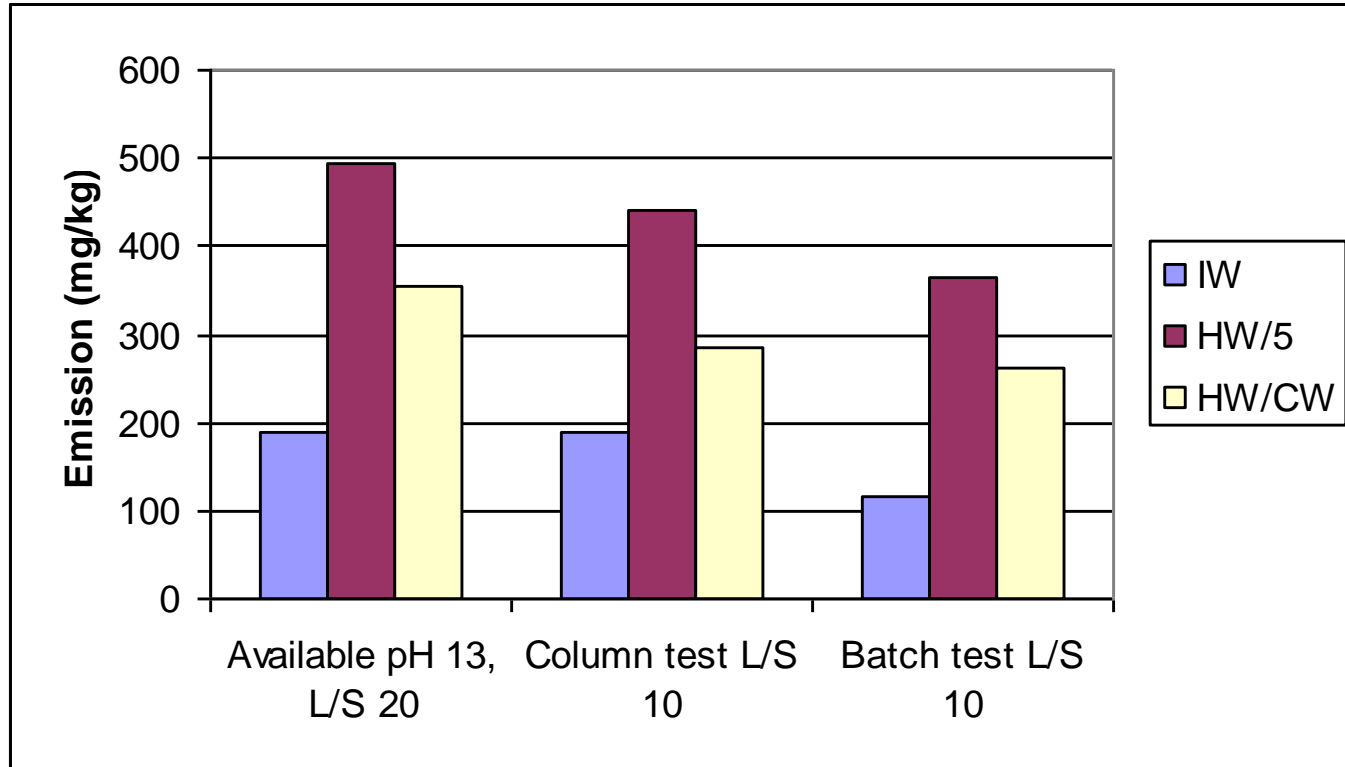
Composition (1): macro components



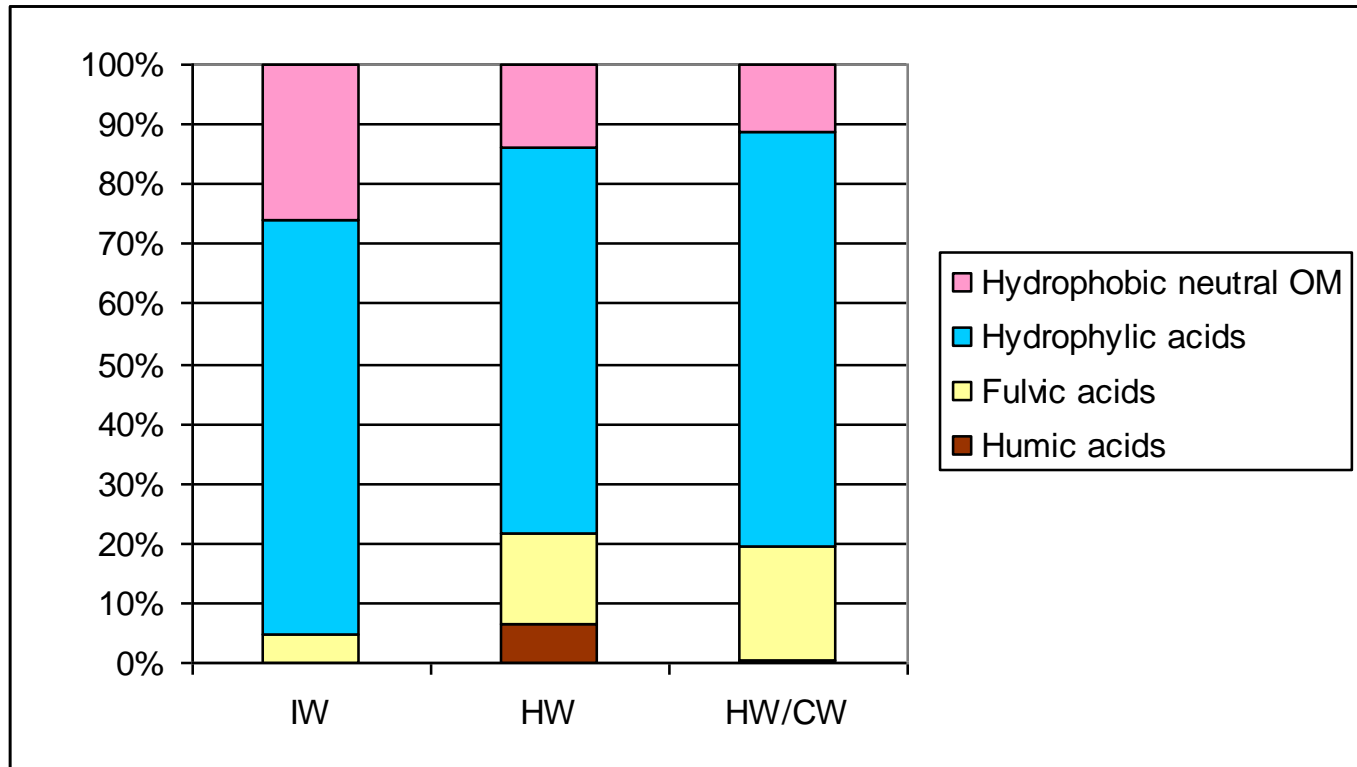
Composition (2): some micro components



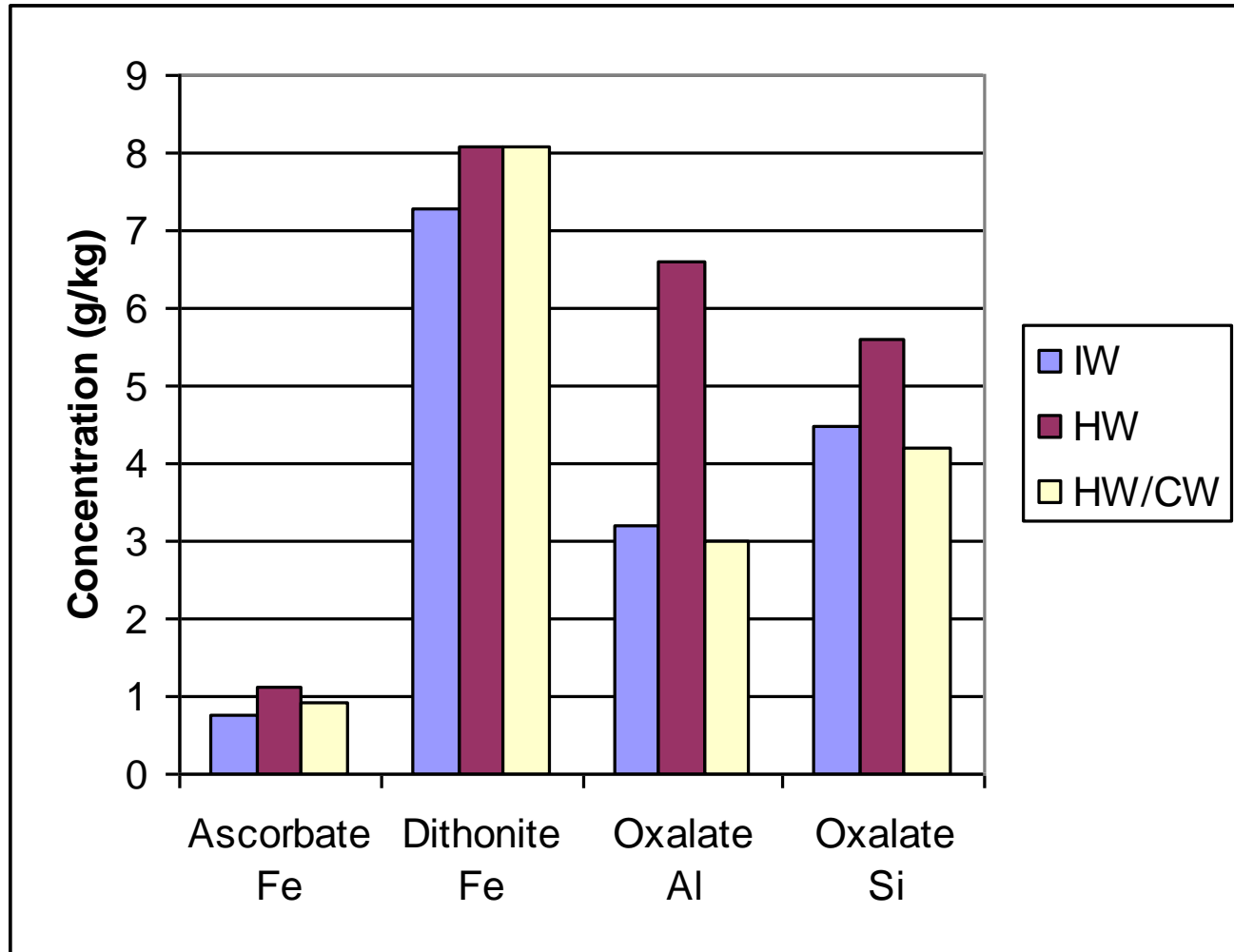
DOC emissions



Speciation of DOC



Amount of iron and aluminum (hydr)oxides and amorphous Al-silicates



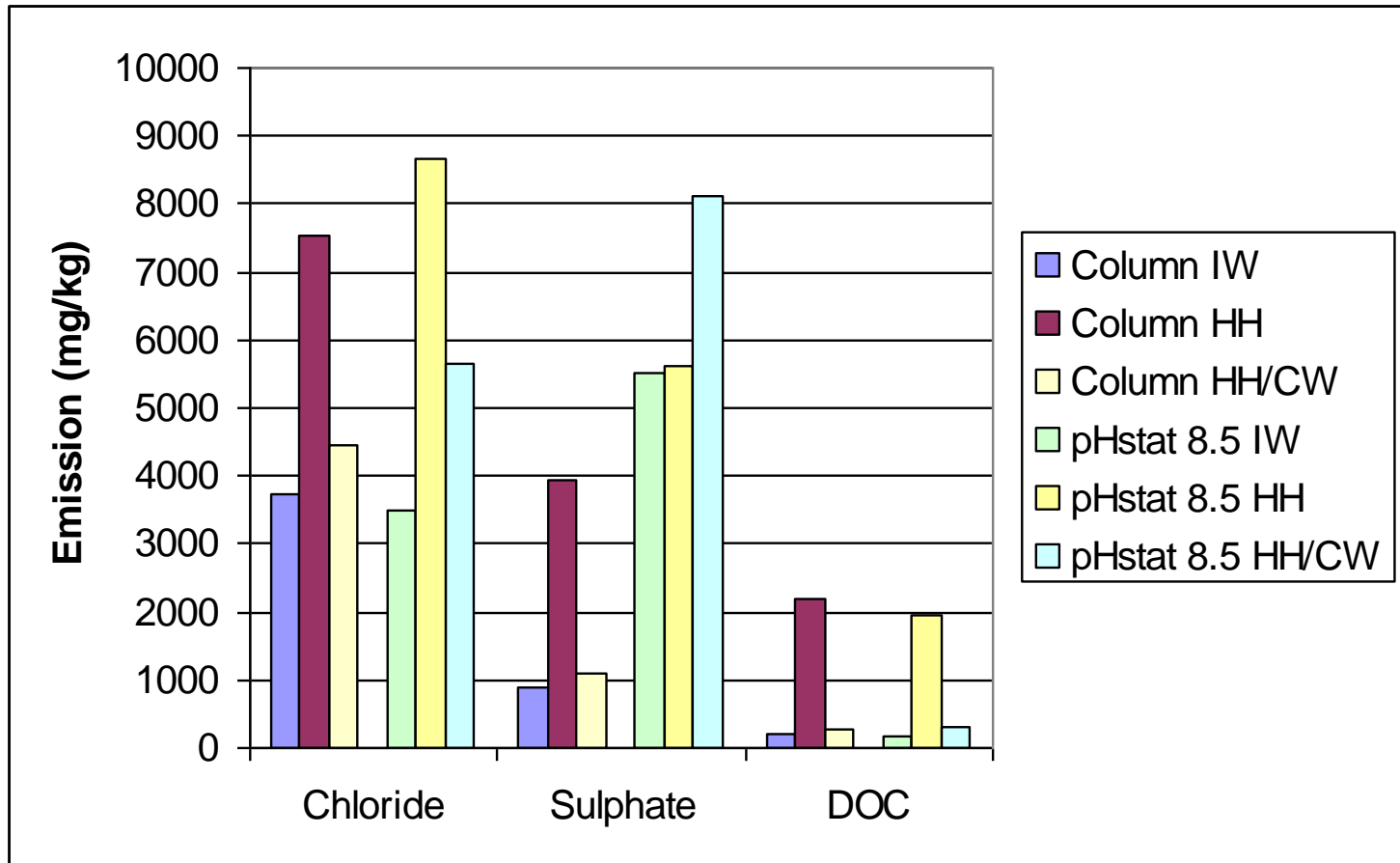
pH values leaching tests

	Industrial Waste (IW)	Household Waste (HH)	Mix Household Commercial Waste (HH/CW)
Column L/S 10	11.2	9.7	12.2
Batch L/S 20	11,1	10.5	12.2



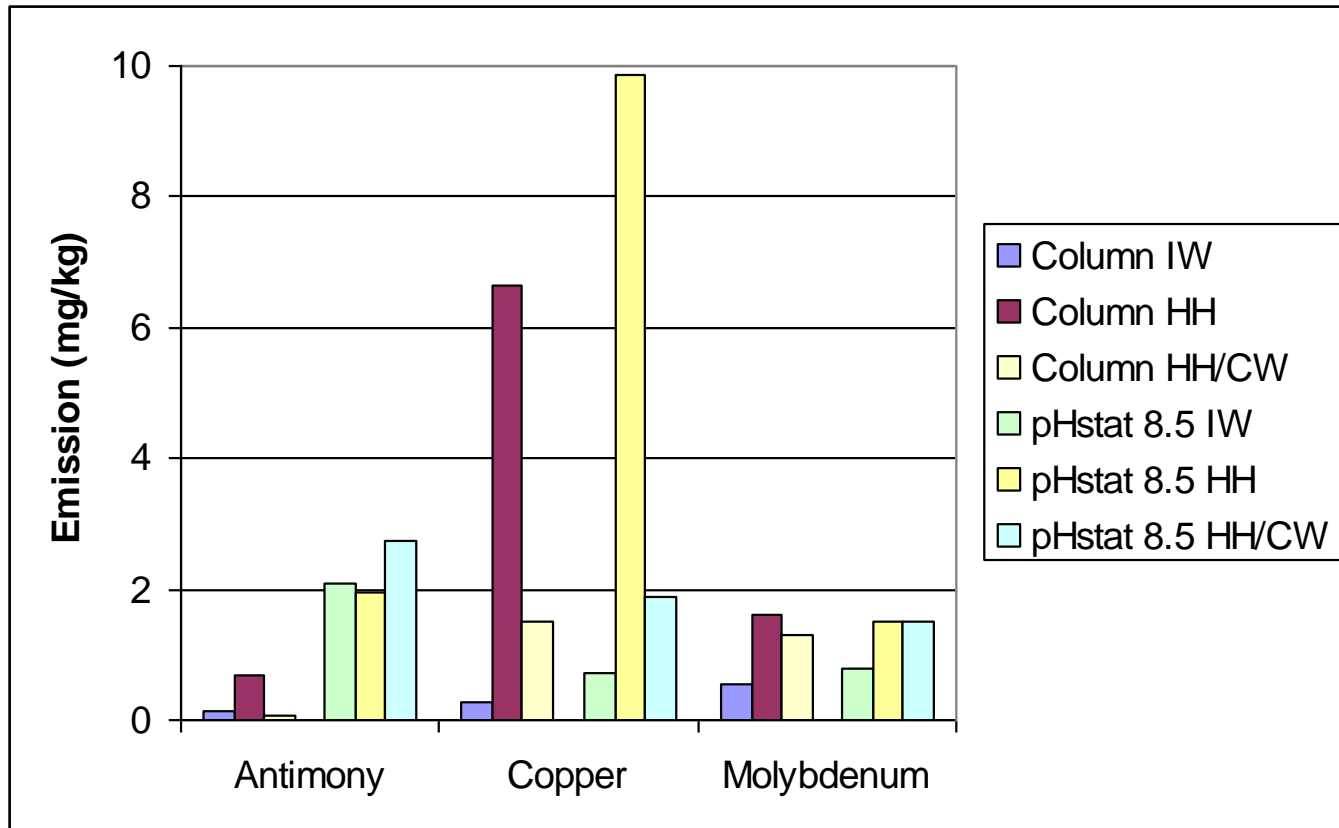
Emissions column test and pH stat test

1. Macro components

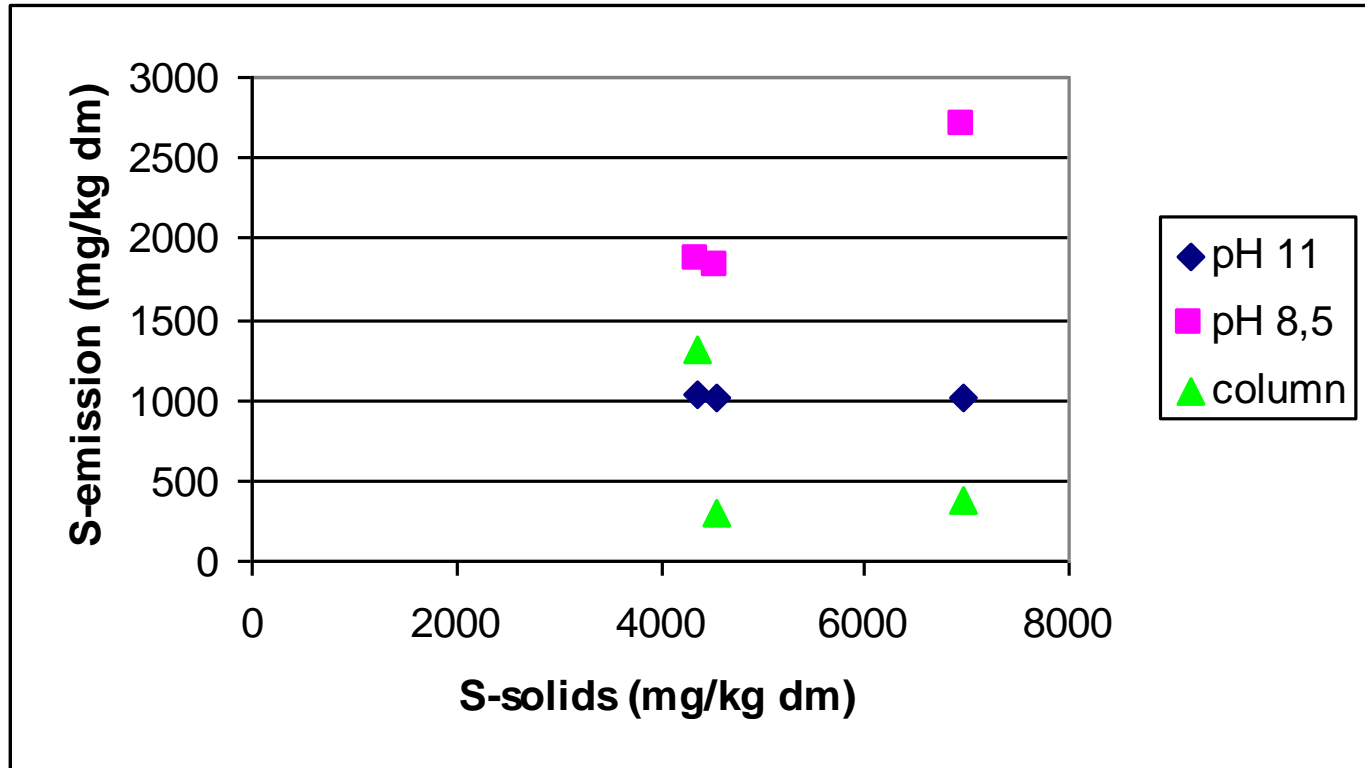


Emissions column test and pH stat test

2. Micro components



Relation total-S in bottom ash – leaching in column and pH-stat tests



Conclusions and discussion - 1

- Source of contaminants
 - Household waste is main source of chloride
 - Commercial waste is main source of antimony, sulphur
- Source of DOC, unburned material
 - Household waste is main source of unburned organic material and DOC, especially humic and fulvic acids
- Macro composition
 - Household waste is main source of Al-(hydr)oxides and amorphous Al-silicates, Fe-(hydr)oxides, commercial waste contains the lowest amounts



Conclusions and discussion - 2

- Generally speaking, burning of mixed waste is better than burning a mono stream
 - The geochemical properties are more diverse
 - The conversion of organic matter may be better
- Perspectives of input management are:
 - Exclusion of highly contaminated waste streams
 - Preparation of an optimal and stable mix of waste
- A good judgment of input effects is only possible if the residues are thoroughly characterized

