

# Bioaccessibility of Flame Retardants in indoor dusts

Sonia García Alcega



# Aim of the study

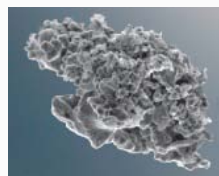
- To determine the bioaccessibility of PBDEs and OPFRs from different indoor dusts.
- Study of dust properties (C content and particle size) and the influence with the bioaccessibility.
- Does the chemical properties of the compounds control the bioaccessibility?

# Material and Methods

- Dust samples
  - Houses
  - Shops
- Dust homogenization
  - 250  $\mu\text{m}$  sieve
- Dusts properties
  - Particle size - laser granulometry
  - Carbon content - flash dynamic combustion
- Dust characterization for PBDEs and OPFRs



# Material and Methods



0.5g dust

CE-PBET  
→



Stomach  
pH 2.5 1h, 37°C



Small Intestine  
pH 7 4h, 37°C

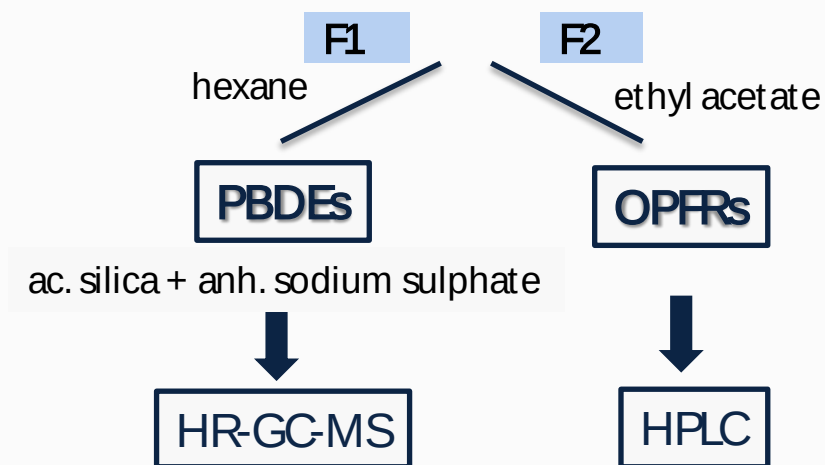


Colon  
pH 6.5 16h, 37°C

Extraction acetone/hexane (1:1)

Clean-up

Florisil® cartridges



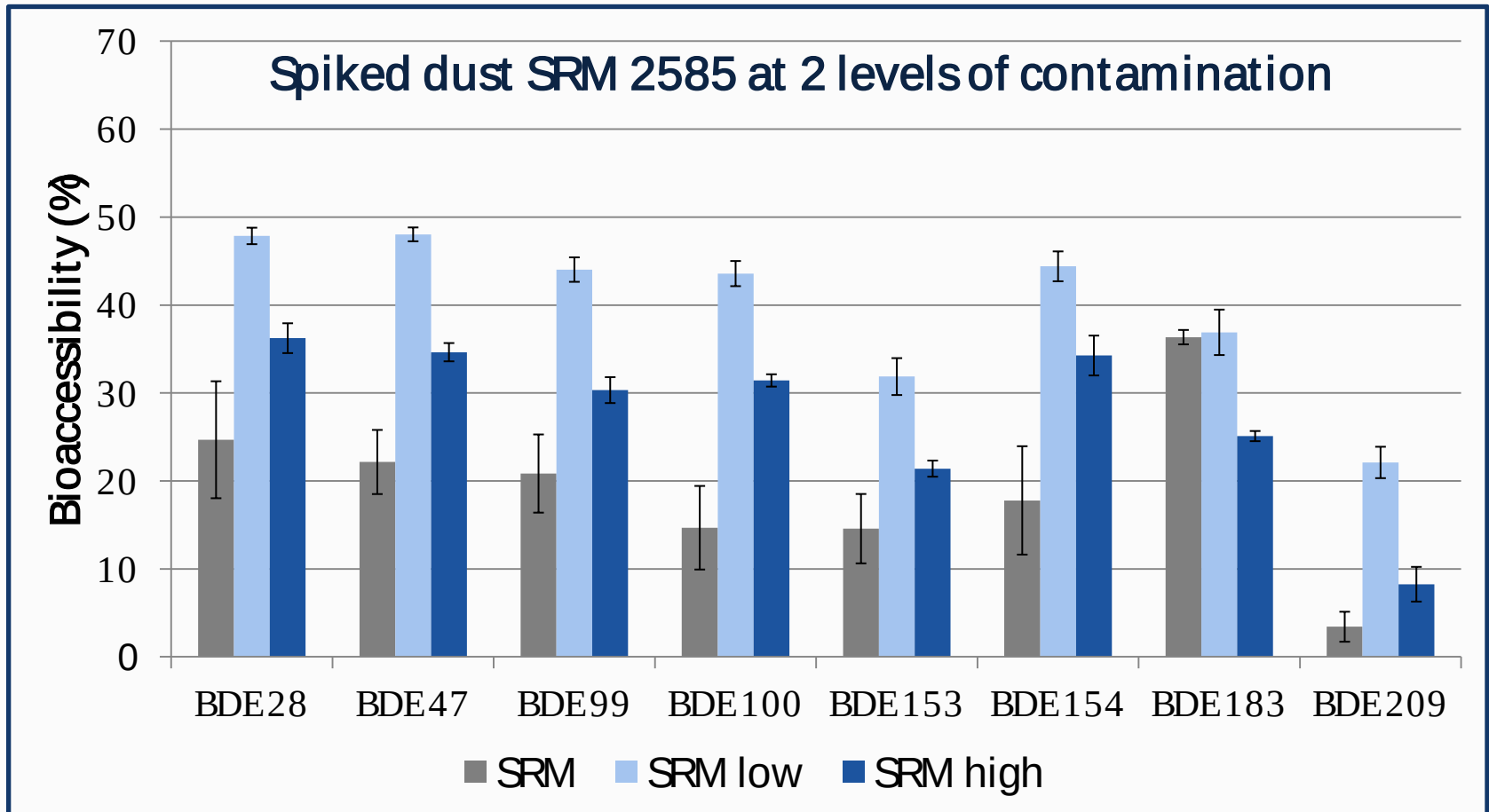
# Results

## Dust characterization

|         | Houses |       |       |      | Shops     |         |         |              |
|---------|--------|-------|-------|------|-----------|---------|---------|--------------|
| ng/g    | Koki   | Chris | Sonia | Mike | Decathlon | ToysRUs | Staples | Bright House |
| BDE-47  | 318    | 6     | 7     | 1    | 4         | 9       | 5       | 9            |
| BDE-99  | 723    | 8     | 11    | 2    | 9         | 11      | 7       | 13           |
| BDE-183 | 6      | 11    | 2     | 2    | 3         | 7       | 8       | 13           |
| BDE-209 | 11660  | 6396  | 31734 | 6033 | 7331      | 8117    | 13298   | 45180        |
| TTP     | 240    | 970   | 330   | 584  | 417       | 741     | 614     | 1175         |
| TDCPP   | 509    | 1161  | 1055  | 1585 | 1716      | 0       | 0       | 0            |
| TCEP    | 831    | 925   | 0     | 0    | 435       | 0       | 1418    | 1328         |
| TnBP    | 140    | 218   | 149   | 197  | 274       | 815     | 399     | 247          |
| TEHP    | 240    | 266   | 138   | 257  | 756       | 722     | 879     | 558          |

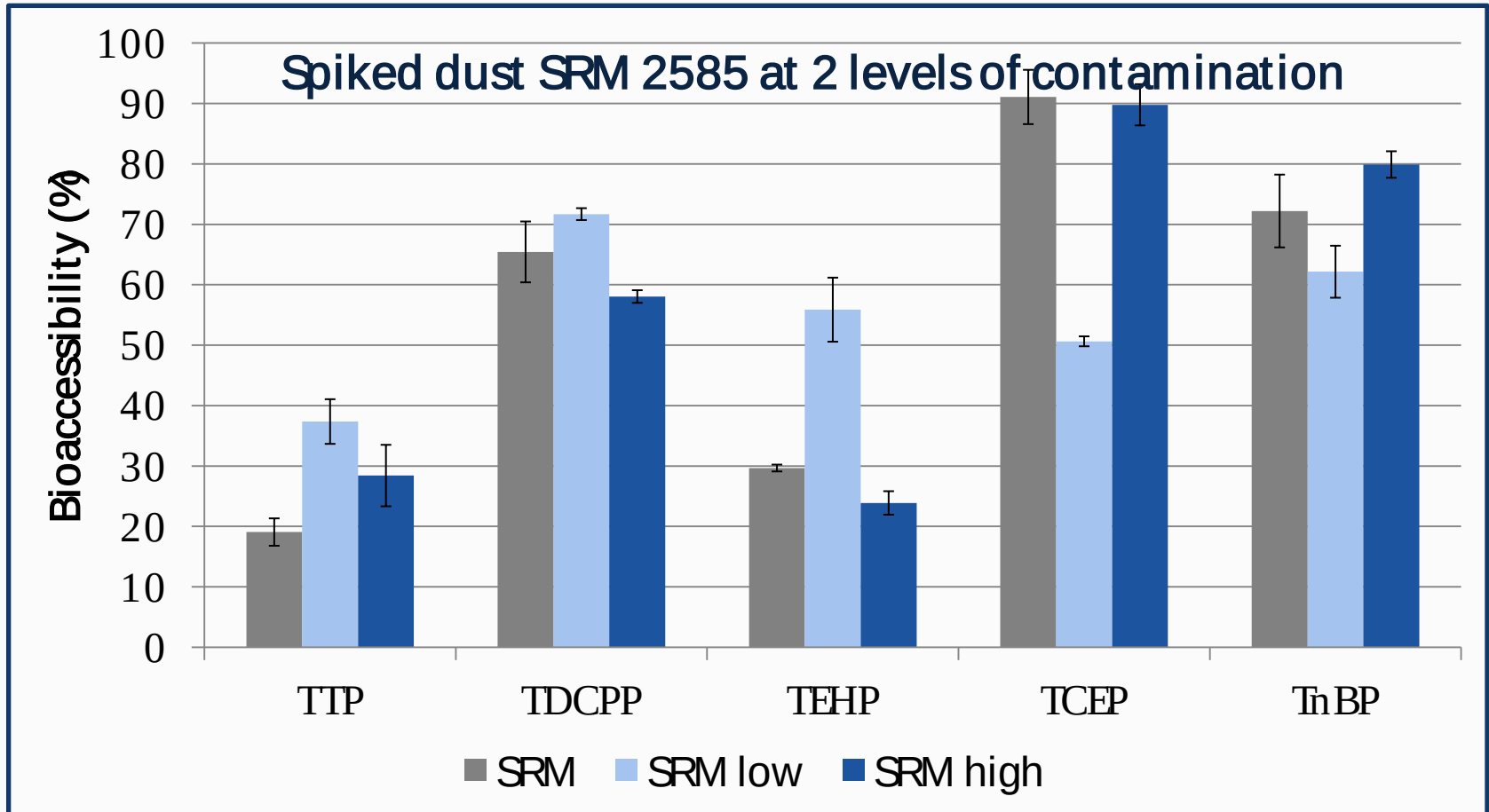
# Results

## Bioaccessibility of PBDEs



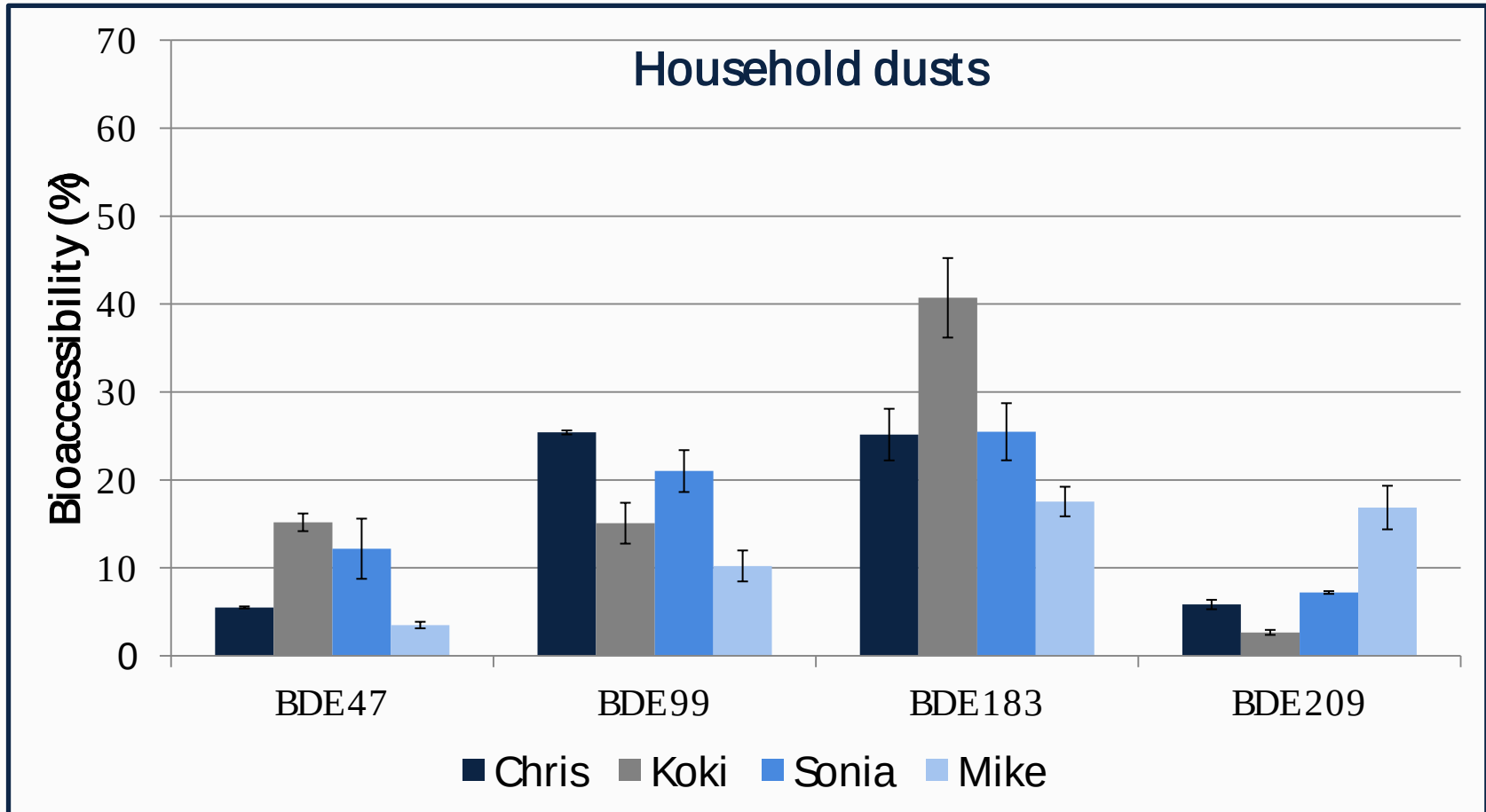
# Results

## Bioaccessibility of OPFRs



# Results

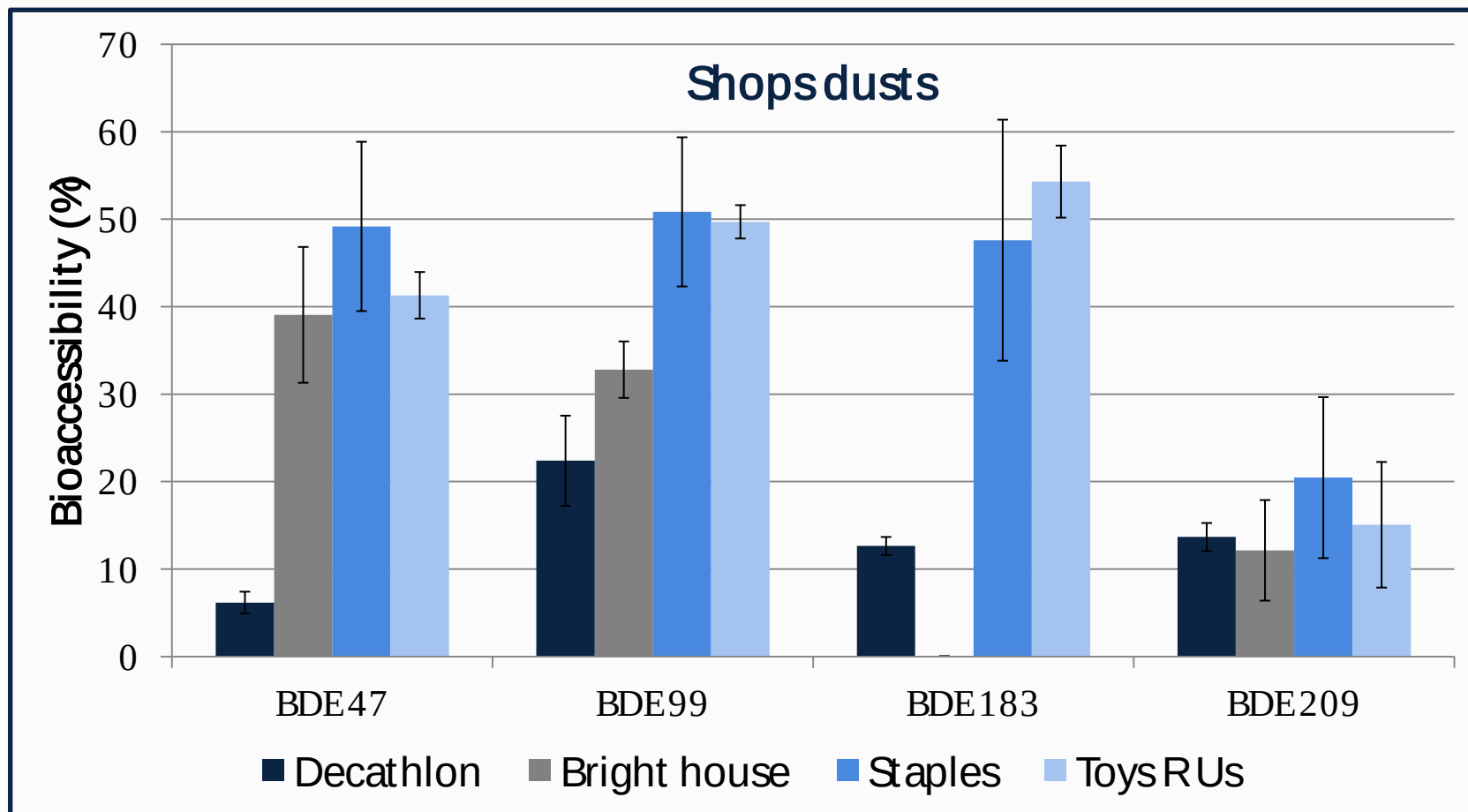
## Bioaccessibility of PBDEs





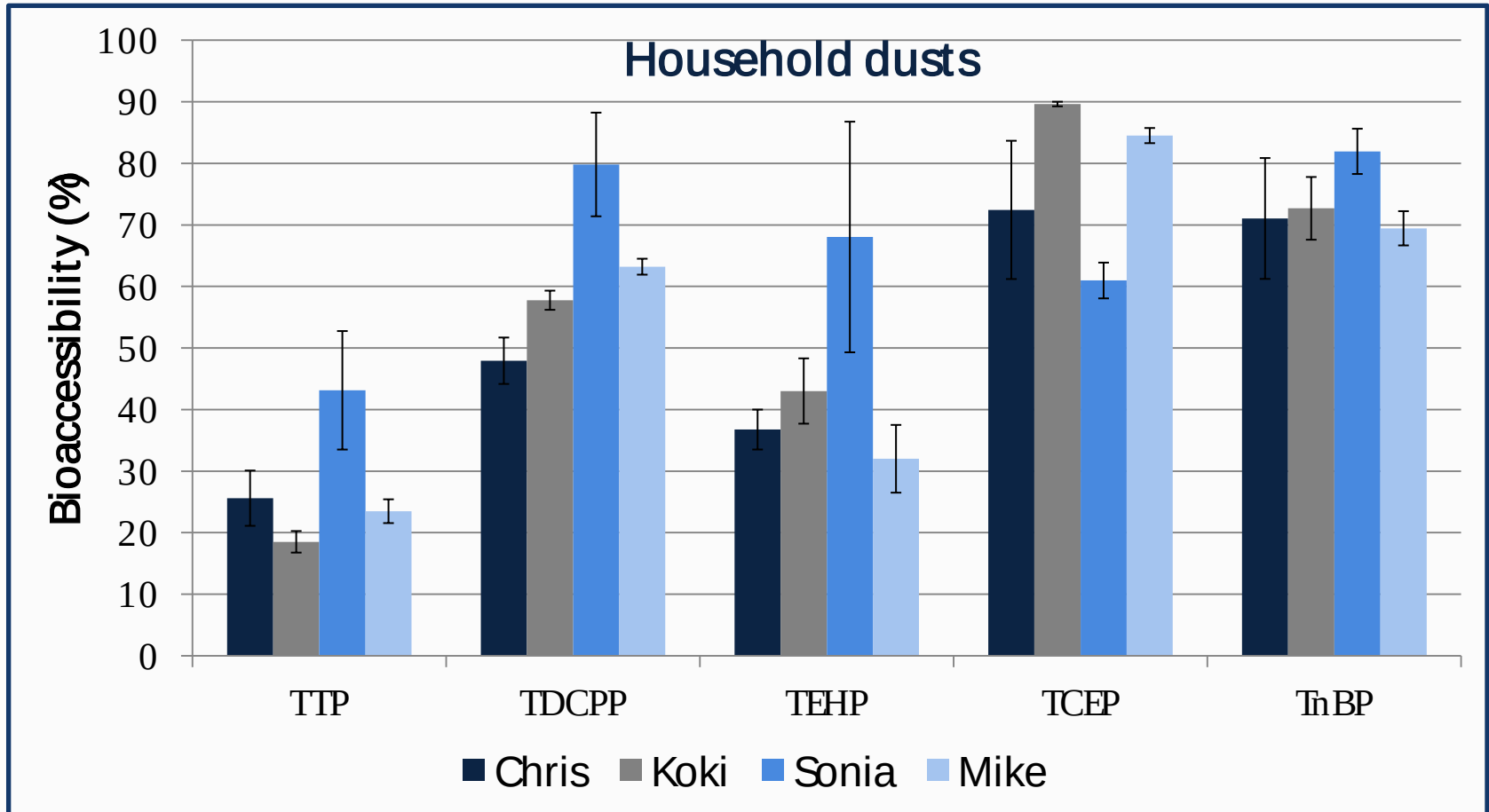
# Results

## Bioaccessibility of PBDEs



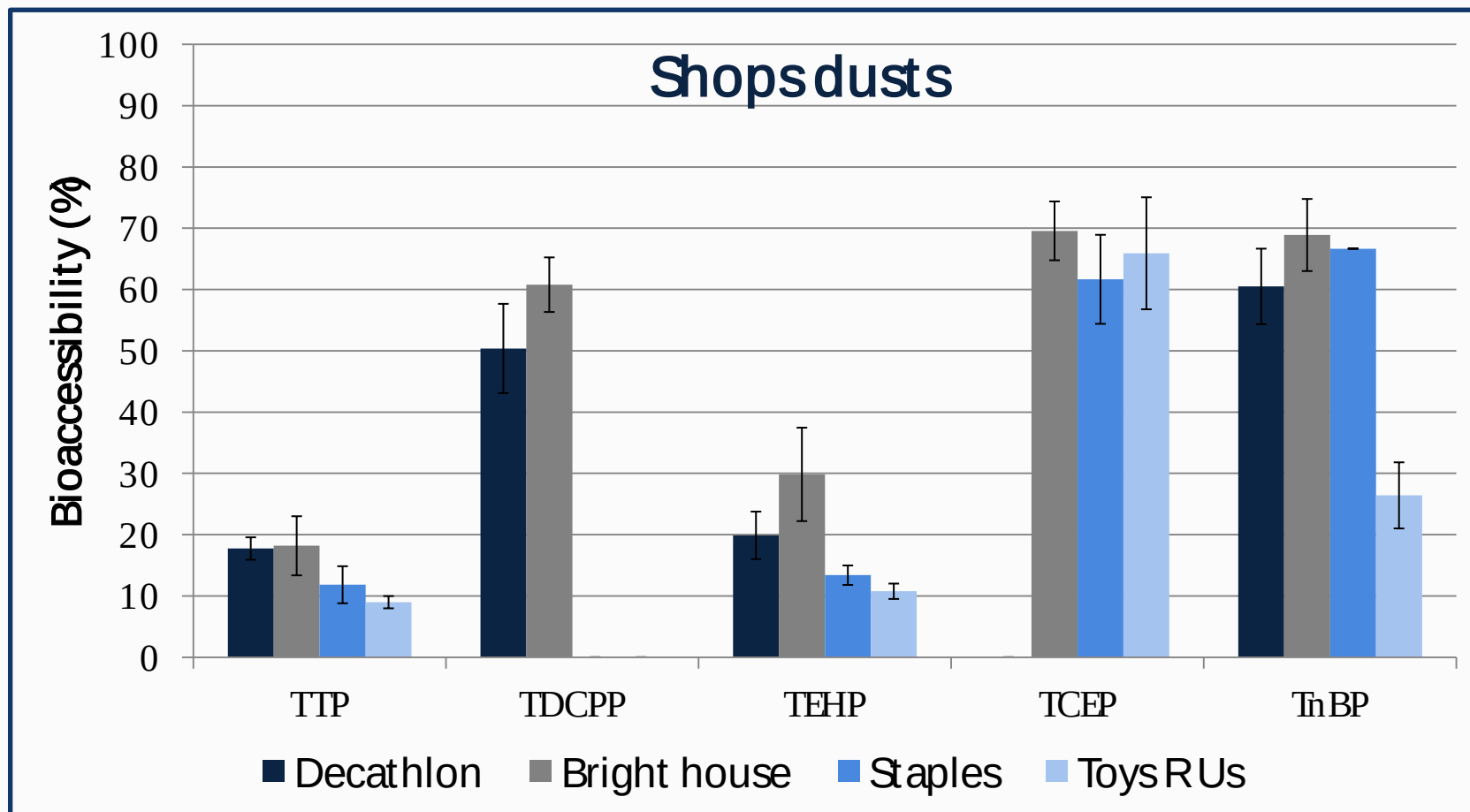
# Results

## Bioaccessibility of OPFRs

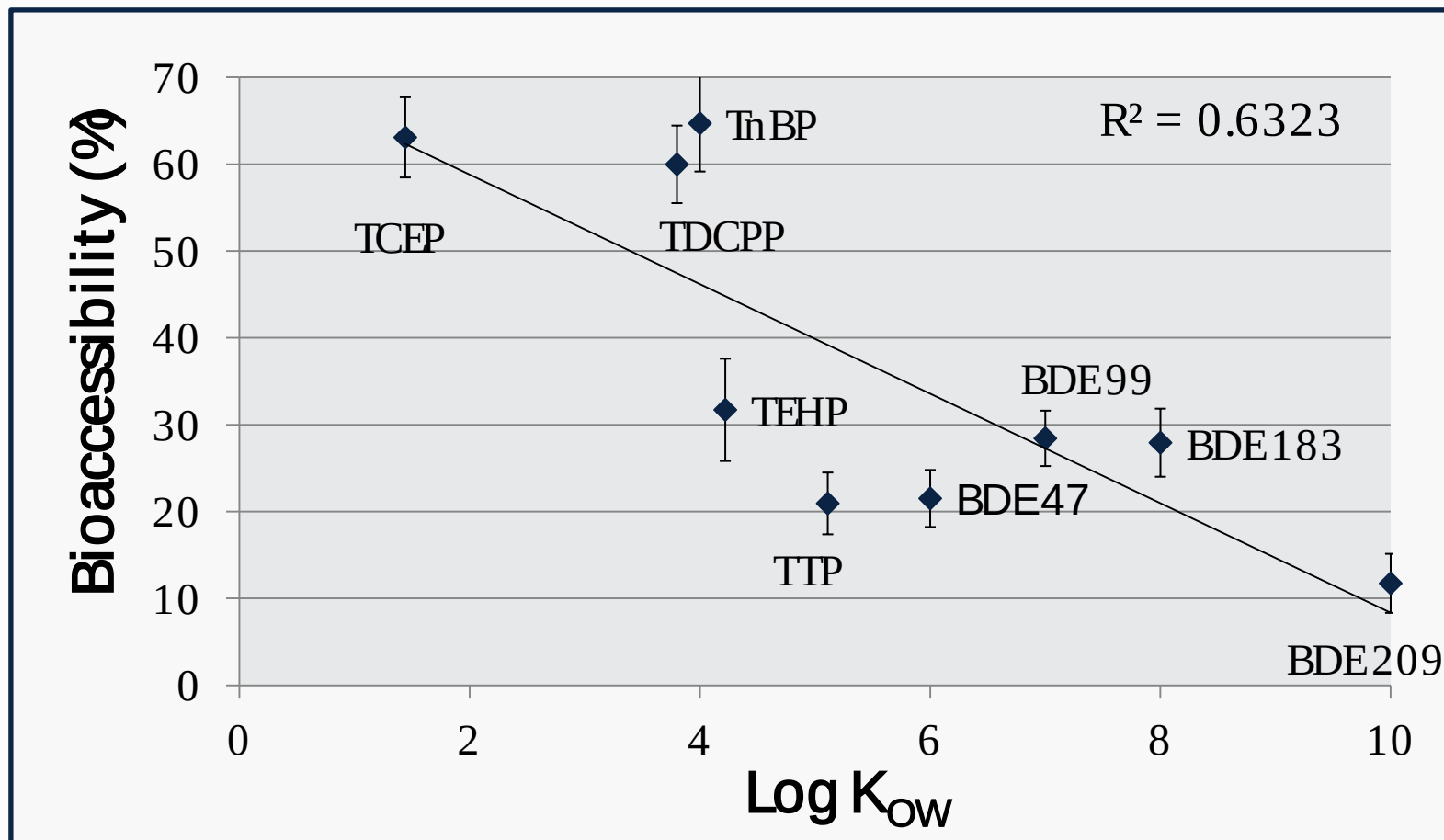


# Results

## Bioaccessibility of OPFRs



# Results



# Conclusions

The bioaccessibility is affected by the combination of many parameters:

- Source of the dusts seems to be important (whether if the dusts comes from houses or shops) not only the C content and the particle size.
- Physicochemical characteristics of the compounds (i.e. PBDEs are less bioaccessible than OPFRs).

# Future work

- Further investigations on the controls on bioaccessibility of different dusts.
- Bioavailability of PBDEs and OPFRs using CaCo2 cells.

# QUESTIONS ?

