

PERSISTENT ORGANIC POLLUTANTS IN BLOOD SERUM OF ELECTRICIANS AND WELDERS IN LATVIA

Authors: Pavels Sudmalis^{a,b}, Marite A. Bake^a, Juris
Rotbergs^b

^aInstitute of Occupational Safety and Environmental Health
of Riga Stradin's University.

^bFaculty of Pharmacy of Riga Stradin's University.

Actuality

- ❑ Persistent organic pollutants (POPs) are one of the most dangerous man-made environmental pollutants, that can cause irreversible health effects - birth defects, cancers, allergies, weakened immune system.
- ❑ In Latvia yet was carried out complex researches about POPs levels in potentially exposed people serum.

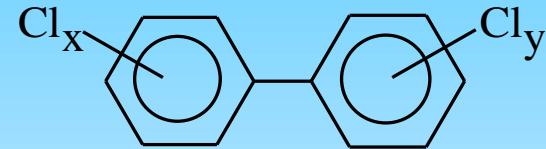
Aim of study

- ❑ Assess POP's concentrations in Latvian employees blood serum, compare the obtained data to another national levels, and evaluate potential risk to health.
 - ❑ identify and quantify POP's in blood serum;
 - ❑ results comparison with situation in another countries;
 - ❑ evaluate potential risk to Latvian employees health.

Determinable compounds

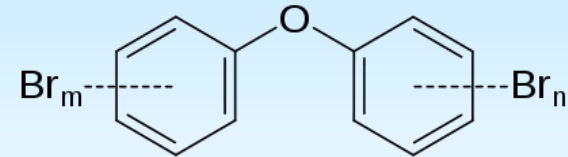
❑ Polychlorinated biphenyls (PCBs) 18 compounds:

- ❑ marker –PCBs (6 compounds);
- ❑ mono-orto –PCBs (8 compounds);
- ❑ non-orto – PCBs (4 compounds).



❑ Polybrominated diphenylethers (PBDEs) 4 compounds:

- ❑ PBDE-47;99;100;153.



❑ Pesticides 6 compounds:

- ❑ o,p'-DDE, p,p'-DDE, o,p'-DDD, p,p'-DDD, o,p'-DDT, p,p'-DDT.

Materials un methods 1

❑ Sample preparation methods approbation:

- ❑ sample preparation method using a simple extraction;

- ❑ sample preparation method with solid phase extraction:

 - ❑ using methanol as solvent:

 - ❑ using isopropanos as solvent

❑ Sample gas chromatographic analysis with:

- ❑ electron capture detector (ECD);

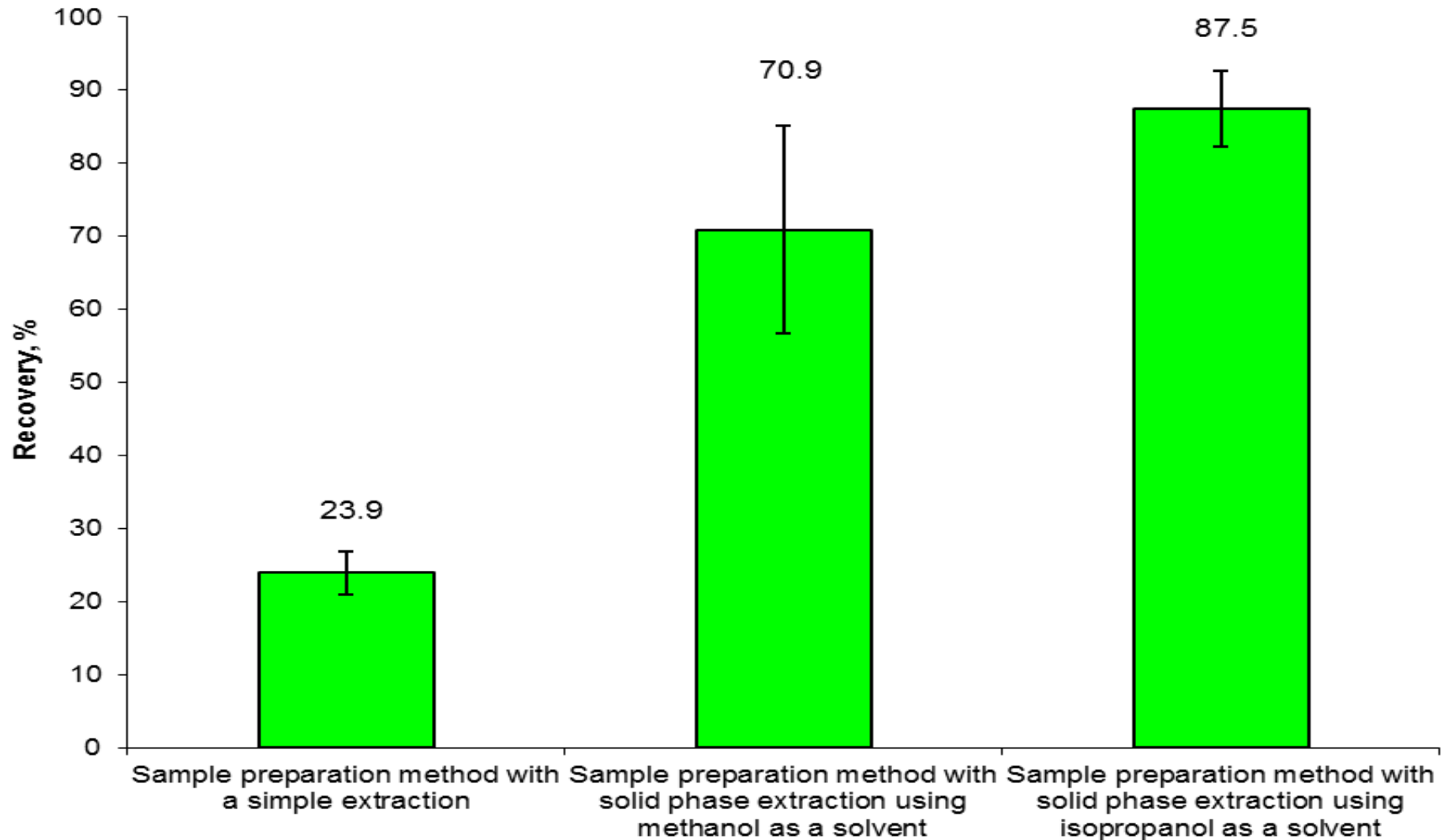
- ❑ mass spectral detector (MS).

Materials un methods 2

- ❑ For research implementation was analyzed 116 blood serum samples:
 - ❑ 25 samples in electricians group (average age 56.6 ± 11.1 years);
 - ❑ 91 samples in welders group (average age 41.3 ± 14.1 years).
- ❑ All individuals involved in research were men.
- ❑ The results of descriptive statistic analysis of the research groups show that age, weight and height data of the subjects of research correspond with the general distribution and that they are comparable.

Results

Comparison of sample preparation methods

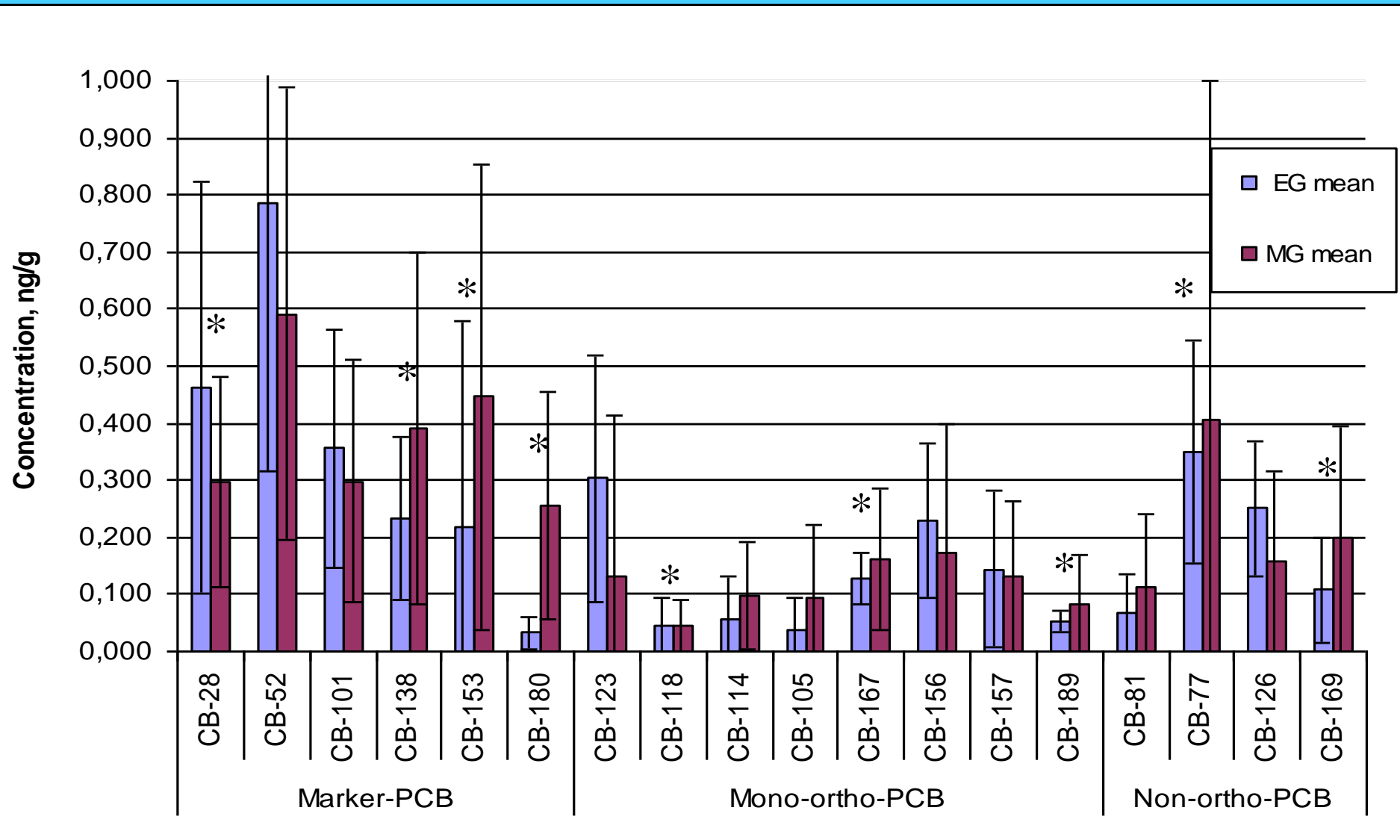


Results of analysis of reference milk

PCB by IUPAC	c PCB detected, ng/g	c PCB given, ng/g	Recovery, %
CB-52	15.92	1.16	1372*
CB-118	2.25	3.30	68.1
CB-153	16.24	19.00	85.5
CB-156	1.12	1.62	69.1
CB-180	10.69	11.00	97.1

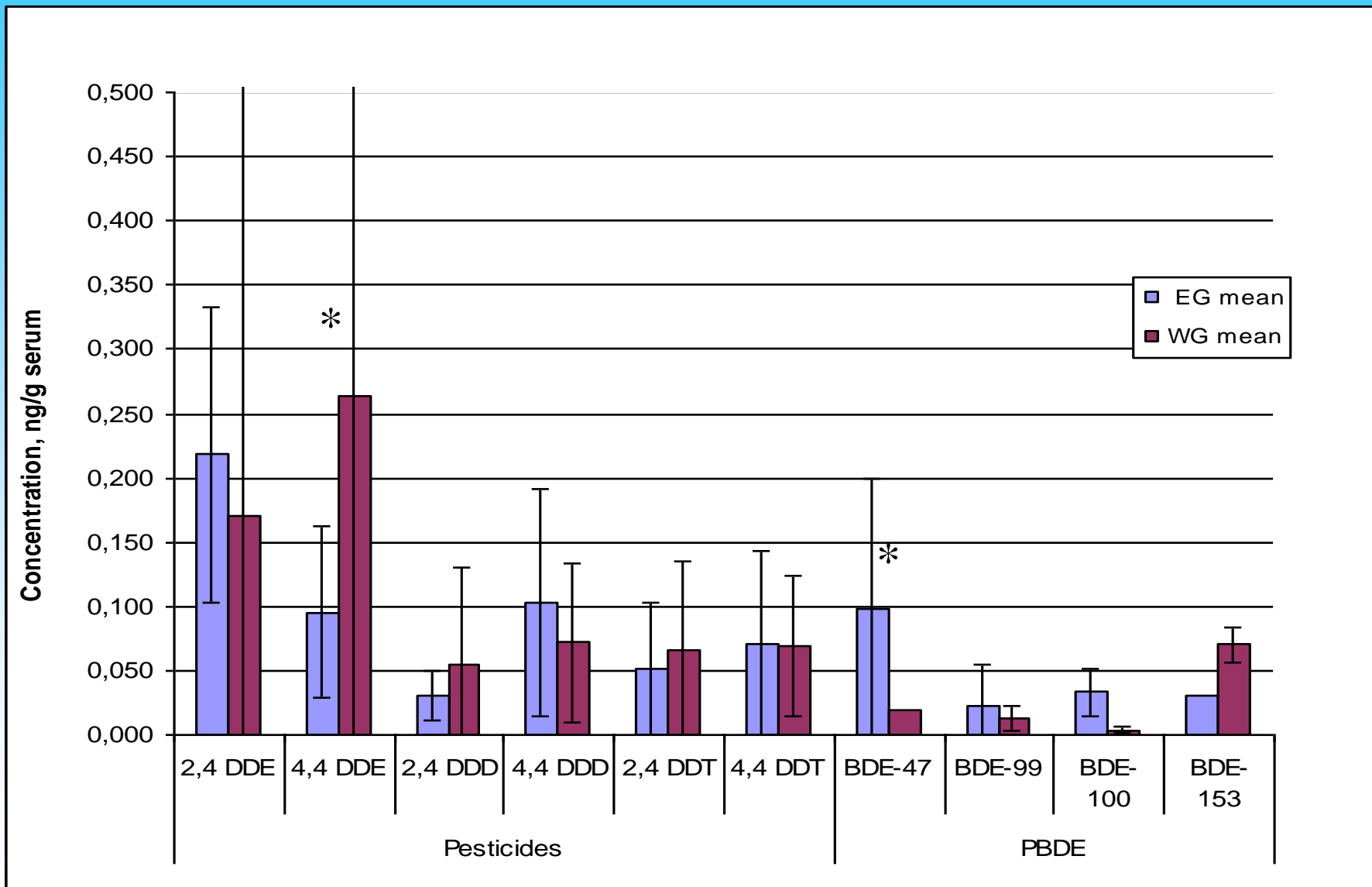
* PCB-52 concentration results is improbable, the obtained results are attributable to the increased overlapping of the peaks

PCB levels in blood serum



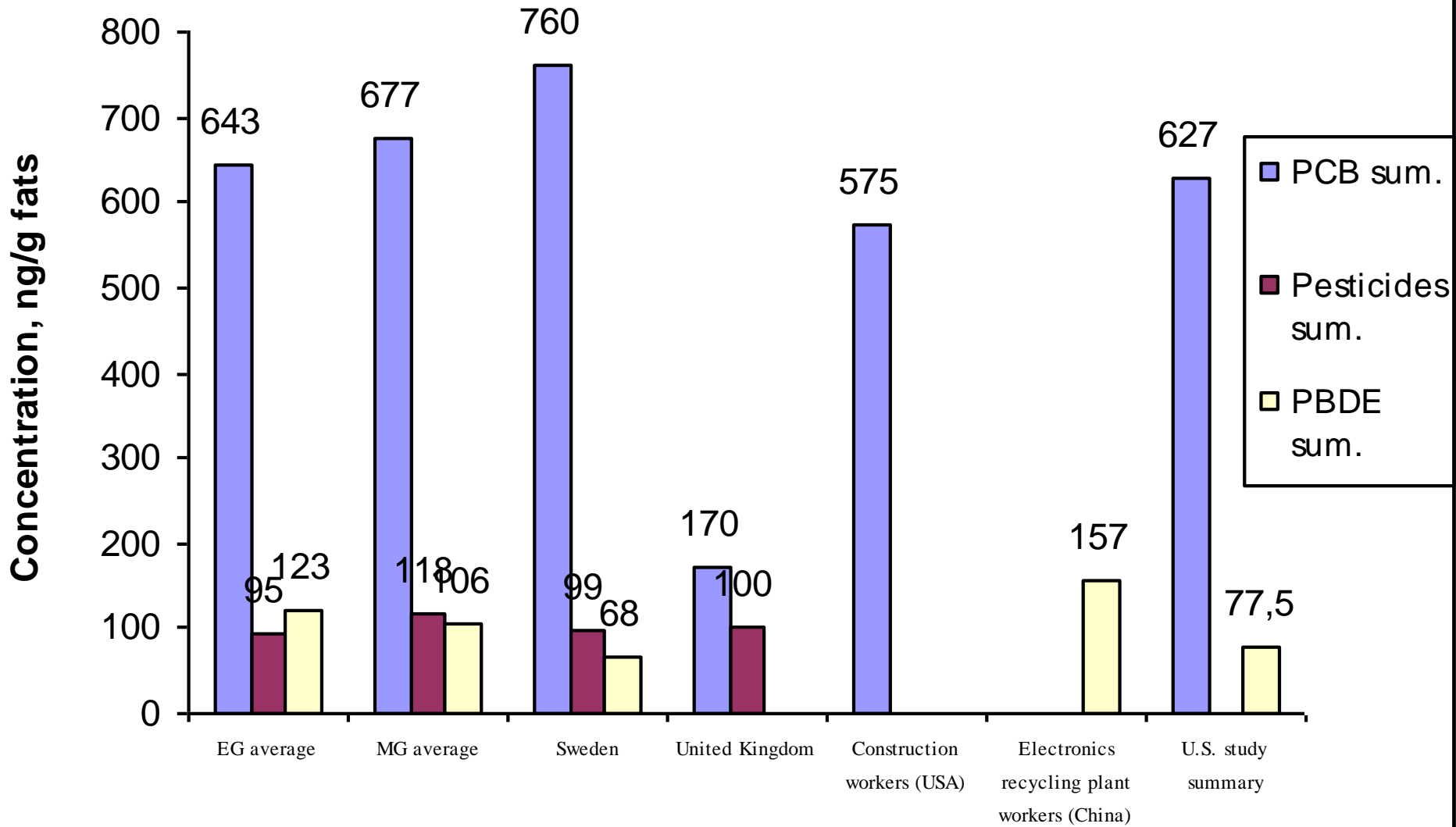
* $p < 0,05$

Pesticides and PBDE levels in blood serum



* $p < 0,05$

POP's levels in blood serum



Conclusions 1

1. Purification of biological samples with solid phase extraction where isopropanol is used as the solvent and the selected gas chromatography parameters enable qualitative and quantitative analysis of environmental and biological samples to detect the presence of POPs (the approach ensures sufficient selectivity and sensitivity).
2. The selected target and control groups are representative, comparable and reflect the risk caused by POPs in the studied groups.

Conclusions 2

3. The POP levels identified in blood serum of electricians and welders correspond to the average European and global levels.
4. The POPs detected in biological samples taken from employees confirm the potential effect of compounds identified in working environment.

A photograph of a university building with autumn trees and a sign that reads "RIGAS STRADINA UNIVERSITATE". The text "Thanks for your attention!" is overlaid in green, stylized font.

*Thanks for your
attention!*

RIGAS STRADINA UNIVERSITATE