MINIATURIZED SAMPLE PREPARATION OF 20µL BLOOD FOR PERSISTENT ORGANIC POLLUTANT ANALYSIS

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Humans all over the world are exposed to chemicals during their life time. Among the thousands of existing anthropogenic compounds are the persistent organic pollutants (POPs). This class of compounds includes polychlorodibenzo-p-dioxins/furans (PCDD/Fs), polychlorobiphenyls (PCBs), organochlorine pesticides (OCPs), and halogenated flame retardants (HFRs). Human biomonitoring of some of those toxic molecules is nowadays typically performed on relatively large samples (5-100mL blood) requiring uncomfortable and badly perceived venipunction for patients. Analysis on 20µL of blood could, by contrast, be considered as non-invasive since it simply consists in pricking the heel or finger to sample a few drops of blood from patients. However, such small biological samples, either in the liquid form or dried on filter paper (dried-blood spots (DBS)) require the development of specific miniaturized methods for reliable analysis at very low level.

We developed a method for the quantification of persistent organic pollutants (POPs), in the context of the Stockholm Convention, by miniaturized solid phase extraction using MEPS (micro-extraction by packed sorbent) and GC-MS/MS. Samples consist in 20μ L of liquid serum as well as 20μ L dried-blood spots. The study aims to push automation and miniaturization to its limits; indeed, a maximum of 150μ L of solvents are needed for the whole procedure. Results were compared to those obtained with classical analysis procedure including GC-HRMS methodology.