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Analysis of POPs in OHM Food Systems: Towards Understanding Contamination and Dispersion

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The Transverse project SASI (Système Alimentaire Sous Influence) studied how "disrupting events" in Estarreja (Portugal), Téssekéré (Senegal), Oyapock (French Guiana), and Littoral-Caraïbe (Guadeloupe) led to changes in dietary practices and perceptions of nature, agroecological systems, and food supply methods (1,2). To understand the dispersion of persistent chemical contaminants in food, a screening for Persistent Organic Pollutants (POPs) was conducted across various food samples from these areas.

Food Sampling in four OHMs

I. Estarreja, Portugal - May and November 2023

- Locally produced fruits, vegetables, and meat sold at the weekly market, plants and soil from fields near the industrial zone



III. Téssekéré, Sénégal- June 2023

- Local weekly markets (Amaly, Widou, Téssekéré), small Stores near houses



II. Oyapock, French Guiana-June 2023

- Sampling from Saint Georges (French Guiana) and Oiapoque, (Brasil) from Grocery stores, supermarket, or directly from farmers



IV. Littoral-Caraïbe, Guadeloupe-June 2023

- Sampling from supermarkets and local market or directly from farmers



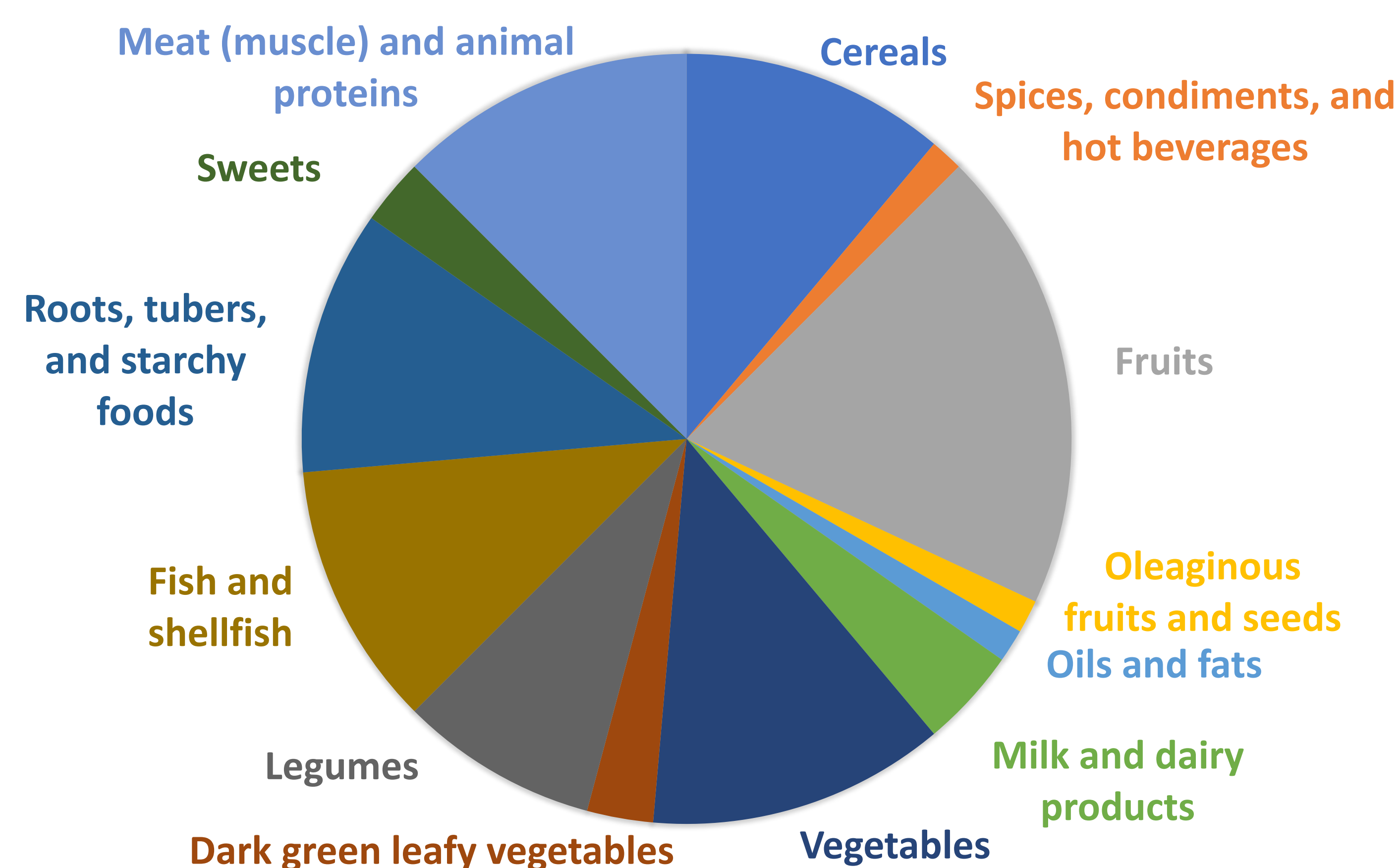
Analysis of Persistent Organic Pollutants (PCB, PCDD/F, NDL-PCB, OCPs)



- Only the edible parts of fruits, vegetables, fish, meat, and chicken were used
- Samples were cut into small pieces and freeze-dried
- Extraction : Pressurized Liquid Extraction (PLE) using SpeedExtractor E-914, Büchi® (Rungis, France)
- Purification and separation of PCDD/Fs, PCDDs, as well as PCBs and OCPs using an automated system (Autosym GO-4-HT; Miura, Japan) (3)
- Separation, detection and identification of the compounds using GC-MS

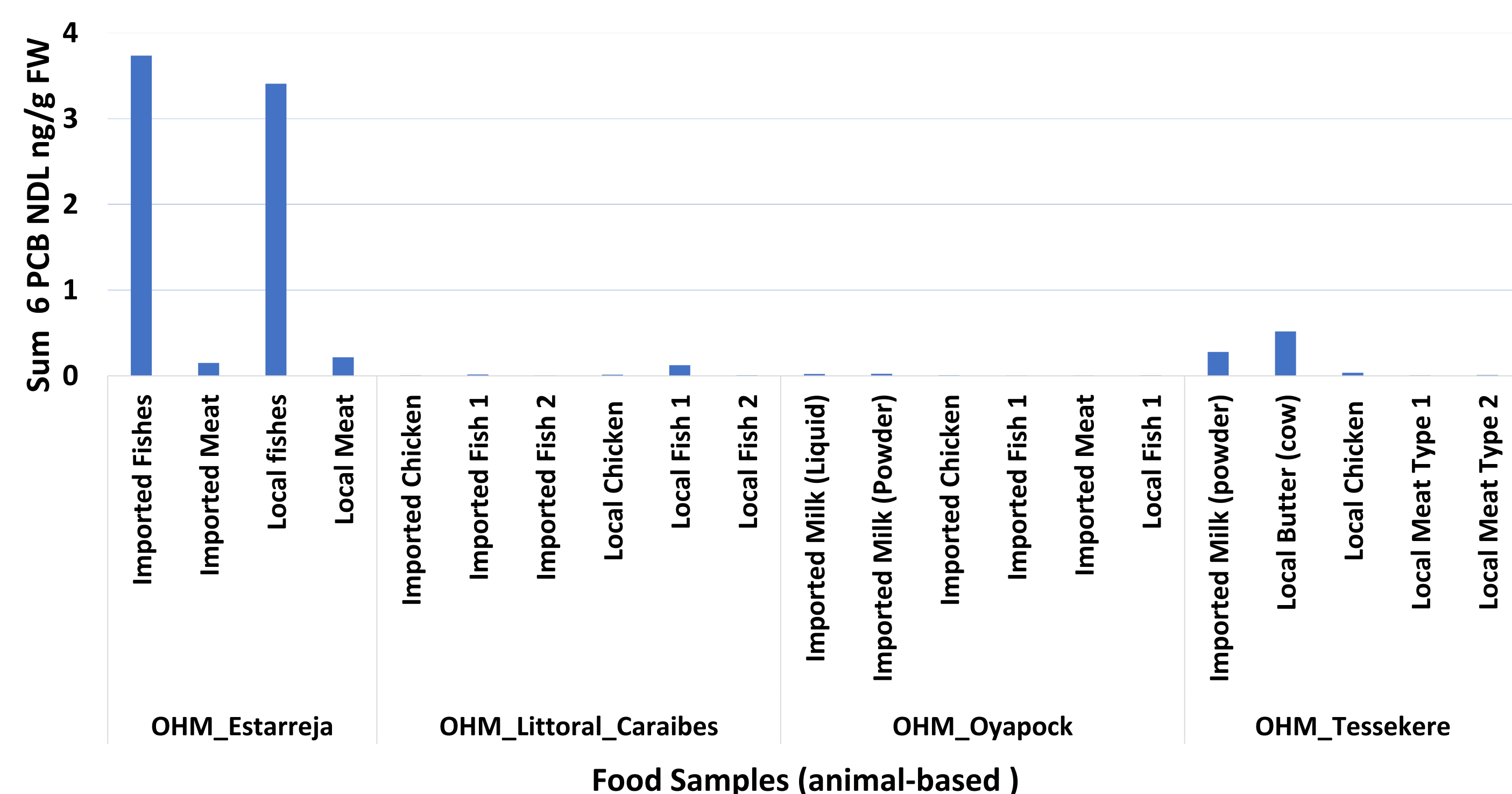
Results

➤ Categories of matrices collected from the 4 sites (234 Samples)



➤ Two samples stood out with high contamination levels:

- Imported fish in Estarreja with 172.99 pg/g of fat of non-coplanar PCB-DL
- Local cow milk butter from the Tessékéré containing 16.58 pg/g of PCDD.
- Values remain below the maximum levels set by the TEQs-WHO 2005, as per the 2023/915 regulation by the European Commission (4).



Conclusion

This study is the first of its kind in these four observatories. In subsequent stages, inorganic contaminants (metallic trace elements) will be analyzed. These findings aim to provide insights into the contamination dispersion in food, an aspect not previously explored in those OHM.

References

- Chenorkian R. Conception and implementation of interdisciplinarity in the Human-Environment Observatories (OHM, CNRS). Nat Sci Soc. juill 2020;28(3-4):292-305.
- Rapinski M, Raymond R, Davy D, Herrmann T, Bedell JP, Ka A, et al. Local Food Systems under Global Influence: The Case of Food, Health and Environment in Five Socio-Ecosystems. Sustainability. 28 janv 2023;15(3):2376.
- Vaccher V, Marchand P, Picherot M, Dervilly-Pinel G, Lesquin E, Brosseau A, et al. Field investigation to determine the environmental source of PCBs in a pig farm. Food Chemistry. avr 2018;245:394-401.
- COMMISSION REGULATION (EU) 2023/915 of 25 April 2023 on maximum levels for certain contaminants in food and repealing Regulation (EC) No 1881/2006.