

P-00799 Distribution homogeneity of environmental contaminants throughout (sub)liver parts

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Introduction

There is a widespread belief that when investigating environmental contaminants in liver, the same sub-part (e.g., lobe, sub-lobe) should be considered within a sample set to ensure comparability of quantitative results. Retrieved literature reports uneven distributions for trace elements in cattle (Luna et al., 2019), pharmaceuticals in humans (Jacobsson et al., 2005) and anticoagulants rodenticides in fox (Taylor et al., 2020). These findings were hypothesised to be related to differences in blood flow, abundances in enzymes or other molecules involved in contaminant partition, and functional units between the right and left lobes of the liver. However, we were unable to find comprehensive and indisputable data in the literature supporting heterogeneity in the distribution of contaminants within the liver, in particular for persistent organic pollutants such as PCDD/Fs, PCBs, or PFAS. Therefore, to ensure comparability of results, the question arises as to whether partial liver sampling (e.g., liver biopsy in a living animal, or random sampling at the slaughterhouse for monitoring purpose) could lead to an over- or underestimation of the content of any specific contaminant, or whether sampling and homogenisation of the entire liver is fundamentally required.

Materials and Methods

The liver of a wild male boar hunted in December 2025 in the Grunewald forest (Berlin, Germany), near a former army training ground, was collected. This species was selected considering available mass of liver (2.46 kg) and the expected presence of moderate to high levels of a diverse range of contaminants. Following an initial visual examination, no apparent lesions or signs of hepatic disease were observed. The liver was subdivided into 15 anatomical sections: four within each lateral lobe (left and right), three within each medial lobe (left and right), and one corresponding to the caudate lobe. Subsamples were homogenised. An average subsample pool (QC) was prepared by mixing aliquotes from all primary subsamples.

Results

So far, results are available for trace elements and PFAS, indicating no significant differences among subsamples, taking into account the analytical variability estimated from the QC (n = 6), except for the caudate lobe. The latter exhibited lower values, possibility related to the higher connective tissue content and/or lower perfusion flow rate.

Discussion and Conclusion

Although statistically limited, this preliminary study based on the liver of a single wild boar suggests that samples collected from any region of the left or right lobes are representative of the whole liver with respect to trace element and PFAS contamination. Additional analyses are planned to determine whether this finding also applies to PCDD/Fs, dl/ndl-PCBs, BFRs, PCNs, OCPs, PCAs, anticoagulant rodenticides and pesticides.

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References

1. Luna et al., 2019. J. Tr. Elem. Med. Biol., 52, 53-57; Jacobsson et al., 2005. J. Gastroent., 40, 733-738; Taylor et al., 2020. Env. Chem. Ecotox., 2, 50-55.