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Quaternary Ammoniums Compounds in Indoor Environment: Links Between Biocidal Uses and Contamination

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Quaternary ammoniums compounds (QACs) are broadly used in our daily life in PPCPs, household products or buildings materials. QACs are known to have impacts on health and environment: asthma, antibiotic resistance, and genotoxic effects on aquatic organisms at low concentrations (Mohapatra et al., 2023). It is therefore important to assess both the health and environmental risks linked to QACs released from indoor practices. Our objectives were to fill the gap about QAC contamination of indoor environment based on a dual approach coupling study of consumption practices and monitoring campaigns. Institutional database concerning QAC sales in France was questioned. Formulation of products from supermarkets and DIY stores were studied (n=3490). Sociological survey about practices and risk perception were conducted among the population (n=200). Five QACs were quantified in indoor settled dust from 19 Parisian dwellings and greywaters from a collective catering building (n=8). In France between 2019 and 2020, QAC consumption has increased by 100% due to the Covid-19 pandemic (Fig. 1). QACs appear to be ubiquitous in indoor environment with a quantification frequency above 75% for all the compounds and matrices, except for C18 in dust. Contents in dust vary from 410 to 25,000 ng/g.dw (median) and reach for C16 more than 73,000 ng/g.dw (Fig. 1). In greywaters, concentrations vary from 36 to 74,000 ng/L. The somehow high QAC levels in samples are explained by the results of consumption surveys and open the door to source reduction to limit the sanitary and environmental risks.

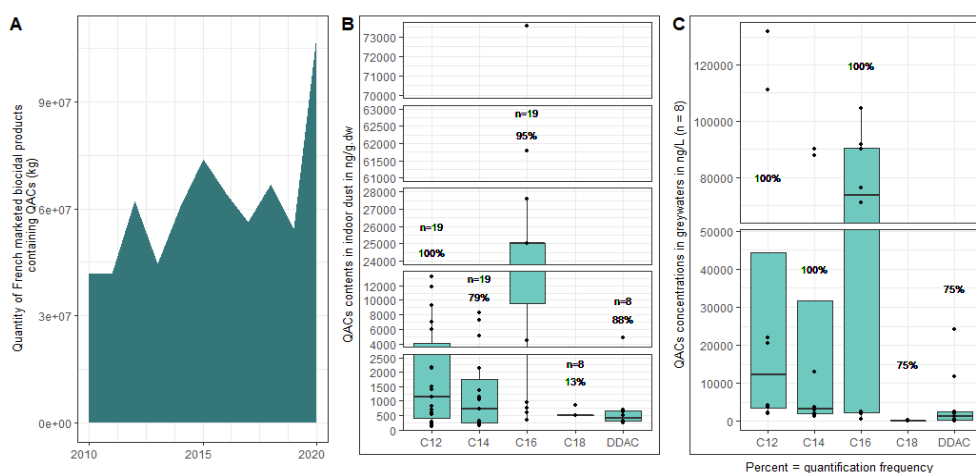


Fig. 1: (A) Evolution of QAC consumption in France according to Simmbad (B) QAC contents in domestic dust (C) QAC concentrations in greywaters

References

Mohapatra, S. et al. (2023) 'Quaternary ammonium compounds of emerging concern: Classification, occurrence, fate, toxicity and antimicrobial resistance', *Journal of Hazardous Materials*, 445, p. 130393. Available at: <https://doi.org/10.1016/j.jhazmat.2022.130393>.