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EMERGING ORGANIC CONTAMINANTS IN INTERIORS

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Recently, emerging contaminants (ECs) have gained the concern of environmental scientists. This class of toxicants is overall typical of indoor environments; aside of work places, interiors of dwellings, public buildings, offices and shopping centers are involved; there, people spend most of the life time (80-90% of the total). In interiors, ECs reach concentrations much higher than outdoors, giving raise to exposure rates up to thousands times higher. Even the way of toxicants' intake changes; indeed, while at open air inhalation is predominant, indoors both ingestion and contact gain importance.
ECs display a wide variety of chemical properties and toxicity forms. Most EDs are organic displaying semi-volatile properties, occur in a number of healthcare and house products, in foods, furniture and building materials; usually EDs are not carcinogenic but promote allergies, immune depression, irritation and other acute effects, endocrine system damages, as well as chronic diseases like diabetes, infertility and psychologic problems. Among ECs, key roles are played by plasticizers (e.g., phthalates and adipates), flame retardants (PBDEs, organic phosphates),. Worth of note, EC chemicals occurring in ambient air and surfaces are distinct from those affecting waters (fluorinated surfactants, alkyl ethoxylates, drug by-products).
No attention is usually paid to psychotropic compounds (with illicit drugs) as well as to pharmaceuticals, analogously to cosmetics whose formulas include a list of anti-oxidants/UV light shields and additives (parabens, alkylphenols, bisphenols; fragrances and siloxanes) ascertained as harmful. Interestingly, these categories affect air in the native form, unlike waters, sewages and wastes, where they occur overall as degradation products [1]. Almost no investigations have been conducted till now and cumulative data bases are poor.
To improve the knowledge at this regards, an extensive study has been undertaken in Italy aimed at identifying a list of target substances (crossing toxic properties and environmental occurrence of ECs, with special focus on drugs and pharmaceuticals), at optimizing the sampling and chemical analysis procedures for both gaseous and particulate chemicals based on bench-top GC-MSD techniques), and at acquiring information about their loads and behaviours in interiors, through in-field measurements conducted at schools, dwellings, offices, labs and hospitals.

References

[1] A. Cecinato, P. Romagnoli, M. Perilli, C. Balducci. Environ. Sci. Pollut. Res., 2017, 35, 21256.