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Progress in deployment of biomass-based activated carbon in point-of-use filters for removal of emerging contaminants from water: A review

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ABSTRACT

Emerging contaminants (ECs) are increasingly being detected in drinking water, posing numerous public health concerns. Granular activated carbon (GAC) offers good prospects for removing ECs at point-of-use (POU), enabling households to have access to safe water. This paper reviews the current advances in deployment of biomass-derived GACs (B-GACs) for removal of ECs at POU. It highlights key sources, pathways and impacts of ECs on public health. It also reveals preparation routes and performance aspects of B-GACs for POU water purification. Knowledge gaps on the subject matter were identified. The review revealed that shells of nuts, which are typically hard and of high density are the most investigated for valorization into GAC for POU water purification. To encourage wide application of B-GACs for POU water purification, there is need to tailor available soft, low-density biomass wastes and suit them as GAC precursors for removal of ECs at the point of use. Future studies need to focus on tailoring the production of B-GACs for removal of specific ECs from water. Additional future research insights include identification of re-generation options for B-GACs, options for removal of residual nanoparticles from the filtrate, lifecycle analysis and costing of various GAC-based POU water filters.

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