

Environmental chemistry for circular economy: Safe-by-design approaches and LCA-based assessment tools (EuChemS DCE - IUPAC)

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Sustainable strategies for future techno- and bio-economies rely on recycling and reusing both non-renewable and renewable resources. This includes for example electronic components and organic residues from biowaste. However, there is significant diversity in valuable resources available for revalorization. The value of these resources depends on their origin and the processes involved in their production and recovery.

When applying organic residues from biowaste revalorization as soil amendments and fertilizers, we can recycle the nutrients contained in the residues. However, this practice may also disperse contaminants into agricultural soils. The same concern applies to revalorization of inorganic wastes, including technological wastes, which may unintentionally circulate impurities and pollutants along with the resources. By utilizing (bio)wastes as soil amendments in agriculture, we risk contaminant transfer into food and fodder plants, ultimately affecting animal and human health.

Similar concerns arise for other waste streams on modern circular processes and revalorization of bio- and technological wastes. To address these issues, comprehensive risk assessments must be integrated into these circular processes. Such an approach will contribute to minimize exposure risks for both the environment and human consumers. Furthermore, it is crucial to implement strategies that prevent the release of hazardous chemicals during production and waste handling. By doing so, we can enhance the safety and sustainability of bioeconomy practices. The planned session will serve as a platform for scientific discussions on pollution-related topics, including identification, risk-assessment, remediation, prevention, and regulation, within the context of waste revalorization and circular processing.