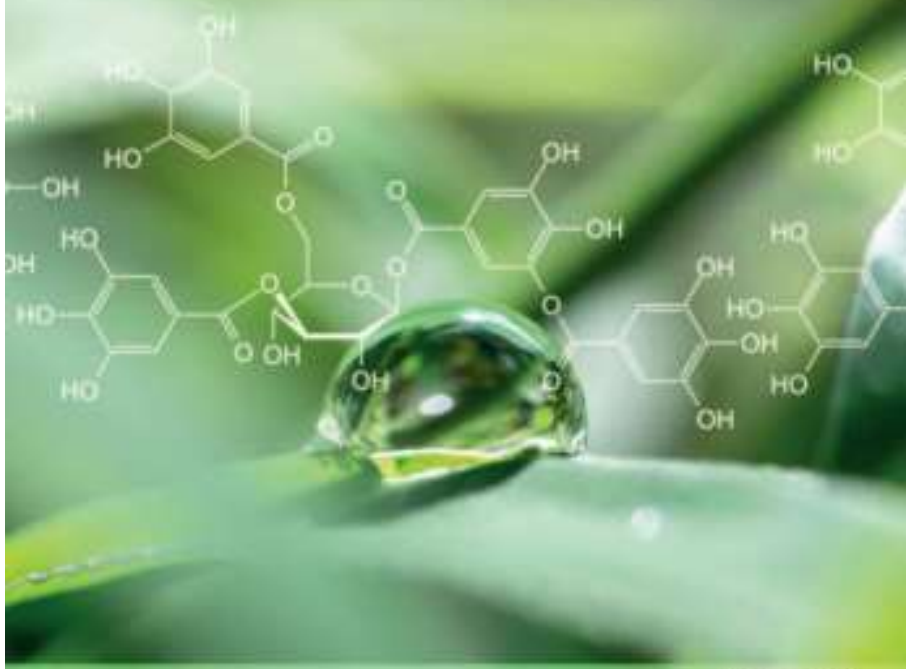
GREEN CHEMISTRY

A Path to Sustainable Development



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19 - Case studies and techno-economic analyses of green chemistry: Future prospects and life cycle assessment

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Abstract

This study delves into the realm of green chemistry, sustainable practices, and life cycle assessment (LCA), exploring their potential in shaping a more environmentally conscious future. Green chemistry principles, defined by 12 key principles, form the foundation for designing clean and eco-friendly chemical products and processes, thus minimizing environmental impact. Sustainable chemistry aligns with these principles, driving natural resource efficiency and adhering to the Sustainable Development Goals set by the United Nations. Life cycle assessment, a comprehensive method, evaluates the environmental footprint of products and processes across their entire lifecycle. Circular economy strategies further enhance sustainability by minimizing waste and maximizing resource utilization. Bioplastics, microalgae-based biofuels, and biofertilizers exemplify applications where green chemistry and circular economy principles hold transformative potential. While challenges persist, collaboration between academia, industry, and government can pave the way for a sustainable future.