

GREEN CHEMISTRY

A Path to Sustainable Development



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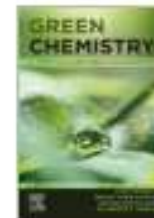
5.	Waste to energy production	399
6.	Energy efficiency	401
7.	Improved utilization of renewable bio-based resources	403
8.	Improved utilization of inorganic resources, minerals, and other nonrenewable resources	404
9.	Material recovery and circular economy principles	405
10.	Sustainable water management	406
11.	Reduced use of chemicals, antibiotics, and other hazardous substances	407
12.	Conclusions	407
	References	408
 Section Five Green chemistry: Challenges, opportunities, and future perspectives of green chemistry		 415
18	Major challenges and opportunities in different sectors	417
	<i>Sandeep N. Tripathi and Sarvesh K. Pandey</i>	
1.	Introduction	417
2.	Major challenges of green chemistry in different sectors	420
3.	Opportunities: A path forward	422
4.	Conclusions	426
	References	426
19	Case studies and techno-economic analyses of green chemistry: Future prospects and life cycle assessment	429
	<i>Susanta Roy, Smrita Singh, Ashutosh Singh Chouhan and Lalit Prasad</i>	
1.	Introduction	429
2.	Algal bioplastics: Life cycle assessment and circular economy	434
3.	Algal biofuel: Life cycle assessment and circular economy	437
4.	Algal bio-based fertilizers: Life cycle assessment and circular economy	442
5.	Microalgal biorefinery: Life cycle assessment and circular economy	443
6.	Policy and structural issues related to CE and GC integration and adoption	446
7.	Future prospects and challenges	451
8.	Conclusion	454
	References	454
 Index		 459



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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.