

# Green Chemistry Today : Scope and Challenges

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**Abstract:** *Green chemistry is a sustainable chemistry that creates safer chemicals including more efficient processes, and sustainable materials, reducing risks to human health and the environment. It also seeks to design chemical products and processes that reduce or eliminate the use and generation of hazardous substances. In fact, Green chemistry can prevent pollution at the molecular level by considering environmental impact throughout a chemical's entire life cycle (design, manufacture, use, disposal etc). It reduces risks to human health and the environment. In the modern era, increasing environmental concerns, climate change, resource depletion, and public health risks have made green chemistry a critical area of scientific research and industrial application. Green chemistry is guided by a set of principles that emphasize preventing waste, maximizing atom economy, improving energy efficiency, using renewable feedstocks, and designing products for degradation. It can be applied across various industries to create safer and more efficient processes. This research paper explores the fundamental principles of green chemistry, its historical development, major aspects and methodologies, applications in various industrial sectors, environmental and socio-economic impacts, challenges in implementation, and future prospects. By integrating sustainability into chemical science, green chemistry offers viable solutions for achieving environmentally responsible growth while maintaining economic competitiveness.*

**Keywords:** Green chemistry, sustainable development, renewable resources, eco-friendly processes, modern chemistry etc

