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A Brief Study of Environment Friendly Chemicals Green Chemistry

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Abstract - Green chemistry reduces the amount of pollutants present in the environment. Green chemistry refers to the application of scientific knowledge to reduce harmful substances through developmental activities. Green chemistry (also called sustainable chemistry) is known as a field of chemistry that focuses on designing products and processes that eliminate or reduce the use and production of hazardous substances. It is a unique approach to developing alternative green and sustainable technologies. As there has been an increase in the use of fertilizers and pesticides to become self-sufficient in terms of food production. Over-exploitation of soil and use of excessive pesticides and fertilizers have deteriorated the quality of soil, air and water. We can discover methods that will help in reducing pollution.

Introduction - Green chemistry, also known as eco-friendly chemistry or sustainable chemistry, is a type of chemistry that is environmentally friendly. The definition of green chemistry proposed by scientists Paul Anastas and John Warner, in which they described green chemistry as the creation of chemical products and processes that reduce or eliminate the use and production of hazardous compounds, most likely is the accepted definition.

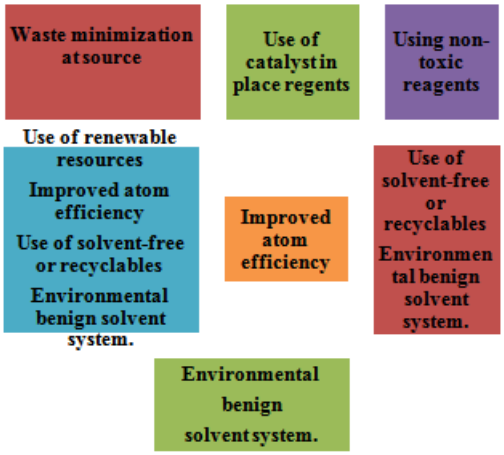
Green chemistry is the process of thinking about and using existing skills and knowledge to reduce the harmful effects of pollution on the environment. During any production process, by-products are generated, which are mainly harmful, and if not used appropriately, they cause environmental pollution. Green chemistry is playing an important role in making the environment clean and pure. The use of knowledge to reduce chemical hazards with development activities is the basis of green chemistry or sustainable chemistry.

Green chemistry is an alternative means of reducing pollution - Twelve Principles of Green Chemistry - It is true that green chemistry is an alternative means of reducing pollution. The following principles justify it.

1. Prevention – It is better to prevent garbage than to clean it. This helps in inefficient use of resources and prevents wastage.
2. Nuclear economy – Innovation of synthetic methods to incorporate all the materials used in the process into the final product. This will reduce waste production.
3. Less hazardous chemical synthesis – Synthetic technologies should avoid the use or production of substances toxic to human health or the environment.
4. Design of safe chemicals – Chemical products should be designed to achieve their desired function while being as non-toxic as possible. Minimizing toxicity, as well as maintaining function and efficacy, can be one of the most challenging things in designing safe products and processes. Achieving this goal requires an understanding of not only chemistry but also the principles of toxicology and environmental science. Chemists often use these highly reactive chemicals to manufacture products. Therefore, designing safe chemicals requires complete knowledge along with excellent skills.
5. Safe solvents and excipients – excipients should be avoided wherever possible, and used in a non-hazardous manner as far as possible.
6. Design for energy efficiency – Energy requirements should be identified according to their environmental and economic impacts, and efforts should be made to reduce them. Energy processes should be conducted at ambient pressure and temperature whenever possible.
7. Use of renewable feedstocks – Whenever technically and economically practical, renewable feedstocks or raw materials should always be preferred over non-renewable ones. Having all of our future fuels, chemicals and materials made from renewable feedstocks or never-ending feedstocks is an important concept to focus on.
8. Minimize derivatives – One of the important principles of green chemistry is to minimize the use of derivatives and protecting groups in the synthesis of the target product. Unnecessary use of derivatives such as protecting groups should be avoided if possible; such steps require additional reagents and may generate additional waste.

9. Catalysis – Compared to stoichiometric reagents, catalytic reagents (as selective as possible) are better than them. It can be used to repeat the reaction in smaller quantities which is superior to stoichiometric reagents.
10. Design for degradation – Chemical products should be designed in such a way that they do not have any harmful effect on the environment. Chemical products must be broken down into non-toxic products. Green chemistry practitioners attempt to optimize the commercial function of a chemical, while minimizing its risks.
11. Real-time analysis for pollution prevention – Analytical methods should be further developed to monitor and control the process in real-time before hazardous substances are created.
12. Inherently safe chemistry for accident prevention – the substances used in chemical processes and the form of the substance are safe.

Impact of Green Chemistry – Green chemistry is a proactive approach to pollution prevention. Green chemistry is based on the following principles.

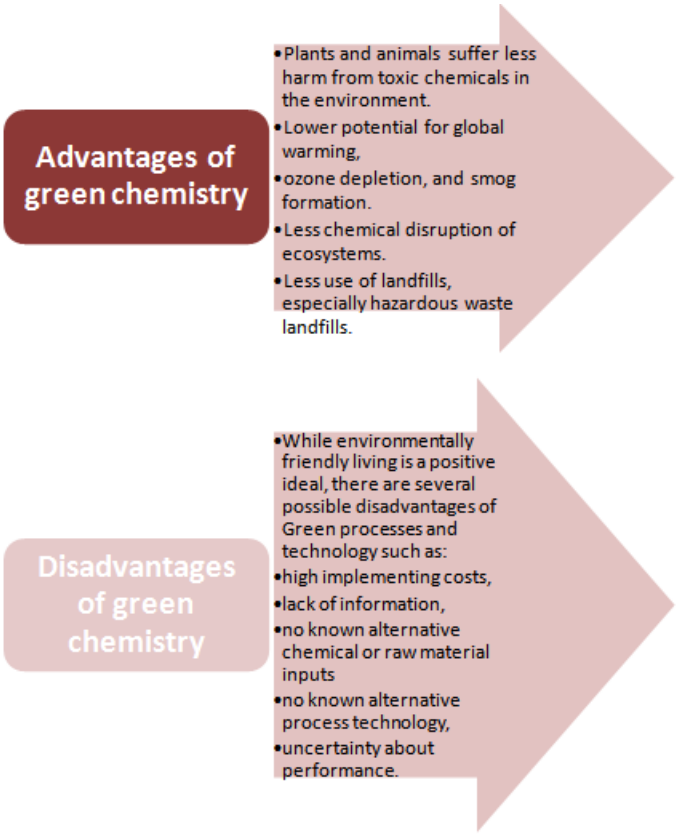


Green chemistry topic in chemical engineering – chemistry studied regarding alternatives to toxic solvents that are renewable in nature. Thus, green chemistry has great potential to reduce the toxicity of industrial sectors by developing safer alternatives.

Typical synthetic techniques in green chemistry :

1. Processes can be adapted by improving specific synthetic methods to make them more environmentally friendly.
2. Emphasis has been laid on preventing waste generation and cleaning after construction.
3. Use synthetic methods to produce substances that are not harmful to human health and the environment.
4. How to design chemical products to maintain effectiveness without using too many additional substances.

Some of the major topics in green chemistry today include reducing our dependence on non-renewable energy sources, reducing industrial carbon footprints, decomposing landfill waste, and taking advantage of abundant resources (waste) that no one wants. Is - for example carbon dioxide.



Conclusion – Green chemistry aims to reduce chemical-related impacts on human health and virtually eliminate environmental pollution through dedicated, sustainable prevention programs. Green chemistry searches for alternative, environmentally friendly reaction media as well as attempts to increase reaction rates and reduce reaction temperatures. The term green chemistry is used to describe the use of more environmentally friendly ingredients in place of hazardous chemicals in the manufacturing, use, and disposal of consumer products. Sustainable green chemistry aims to reduce pollution and negative environmental impacts associated with industrial waste and product disposal by incorporating more environmentally friendly chemicals into design and manufacturing processes.

Suggestion:

1. Green chemicals are the pillars that hold our sustainable future. In the development of green chemistry, it has been realized that the next generation of scientists should be trained in methods, techniques and principles with green chemistry as their core subject.
2. Students should be educated about the structure, results, mechanisms, controlling forces and economic values of chemical processes as well as the attendant hazards of these chemicals and processes to human health and the environment.
3. Teachers need appropriate tools, training and materials to effectively integrate green chemistry into their

teaching and research. The following important steps need to be taken to integrate green chemistry into the curriculum.

i. Development and use of experimental laboratory tests to demonstrate green chemistry principles.
ii. To give information about the basic concepts of chemical toxicology and the evidentiary basis of danger.
iii. To encourage students/researchers to work on green chemistry projects.
iv. Preparing reference material to include green chemistry in existing courses.

4. The most successful chemical companies of the future will be those that can capitalize on their competitive advantage opportunities and the most successful chemicals of the future will be those that can utilize green chemistry concepts in R&D, innovation and education.

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