

“Green Chemistry, a new ray of hope for pollution free better environment.”

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ABSTRACT: ‘Green Chemistry is the efficient designing of chemical products and processes that reduced or eliminate the generation of Hazardous substances.

Since the 1940, Social movement have revolutionized green chemistry and provided Shift in Industrial position and sustainable process with advance in environmental Impact. In 1990s, Paul Anastus and John Warnes, give the 12 principles of green chemistry, which mainly focus on the minimization of toxic solvent in chemical process. In this paper review, the Impact of green chemistry on environmental, pharmaceutical analysis, population specially emphasis on environment sustainability is discussed. For sustainable development green chemistry, focus on creating products and materials in a highly efficient manner to reduce of minimize the pollution level. One of the efficient way for sustainable environment with the help of green chemistry is using of renewable feed stock and Designing material for self-degradation. Beside this safer solvent production, Designing safer chemical aids to an ideal solvent which is natural, non-toxic, and easily available. We can also say that the overall success of green chemistry depends on the Training and giving education to our future generation.

Keywords – Green Chemistry, Safer Solvent, Less Hazardous Chemicals, Sustainable Environment

I. INTRODUCTION :-

Green chemistry is a defined as reduction of environmental damage accompanied by the production of safer material and minimization of pollution level created during different chemical processes.

We can say green chemistry is a new technique Involves in the synthesis, processing, and application of chemical material in such manner as to minimize hazards to environment.

Basic princible of green chemistry: -

Green Chemistry is based on the 12 principles proposed by Anastas and Warner in 1990's. in Modern day, these 12 principle of green chemistry are considered main pillar for developing sustainable environment.

1) Waste prevention: -
Prioritize the prevention of waste, rather than cleaning up and treating waste after it has been created.

2) Atom economy: -
Reduce waste at the molecular level by maximizing the number of atoms from all reagents that are incorporated into the final produce.

3) Less Hazardous Chemical synthesis: -
Design chemical reaction and synthetic route to be as safe as possible. Consider the hazards of all substances handled During the reaction.

4) Designing Safer Chemicals: -
Minimize toxicity directly by the molecular design. Product and evaluate aspects such as physical properties, toxicity and environmental fate.

5) Safer Solvent & Auxiliaries: -
Choose the safest solvent available for any given step. Minimize the total amount of solvents and auxiliary substances used.

6) Design for energy efficiency :-
Choose the least energy – Intensive chemical route.

7) Use of renewable feedstocks: -
Use chemical which are from renewable (i.e. plant based) sources.

8) Reduce derivatives: -
Minimize the use of temporary derivatives such as protecting groups.

9) Catalysis: -

Use Catalysis instead of stoichiometric reagents in reactions.

10) Design for Degradation: -
Design chemicals that degrade and can be discarded easily.

11) Real time pollution Prevention:-
Monitor chemical reaction in real-time as they occur to prevent the formation and release of any potentially hazardous and polluting substance.

12) Safer Chemistry for accident Prevention: -
Choose and develop chemical procedure that are safer and minimize the risk of accidents.

Green Chemistry and Sustainable development:

Green chemistry and sustainable essentially go hand to hand. We need Greener chemistry which efficiently utilize renewable raw materials, eliminates waste and avoid the use of toxic and or hazardous solvents.

1. Prevention:

It is better to prevent waste than to treat prevention leads to better environment.

2. Atom Economy:

This principle states that for sustainable environment it is best to use all atom in a process. This make the product are more efficient and minimize waste.

3. Less hazardous chemical synthesis: -

The main goal is to reduce the hazardous effect of the chemicals that are used during the production of material. Synthetic methodologies should be designed to generate less toxic, less hazardous material.

For Example:- Chlorofluoro carbons which contribute to O₃ Depletion, have now replaced by CO₂.

4. Designing Safer Chemicals: -

Pharmaceutical products often consist of chiral molecules and can be life-threatening. So, Designing Safer Chemicals must be important steps for sustainable environment.

5. Safer Solvents: -

For Day to Day purpose we use solvents regularly. Organic Solvent have been used that may be highly toxic.

CCl₄, CHCl₃, CH₂Cl₂, benzene etc. utilize large amount of solvents which make environment

polluted. An ideal green solvent must be less toxic, cheap and easily available.

6. Design for energy efficiency: -

Designing energy efficient product which reduce global warming and reducing associate pollution and lost.

7. Use of renewable food stocks: -

Our Modern Society depends on petroleum for transportation and energy, Bio-diesel is the alternative way that can be used for Transportation.

8. Reduce derivatives: -

Unnecessary derivative must be avoided, for better eco-friendly materials.

9. Catalysis: -

Catalysts are used to reduce energy requirement and to make reaction happen more efficiently. Green catalyst will have no toxicity in the process.

10. Designing for degradation: -

The main principle is to design product in such a way that they perform their function more conveniently.

11. Pollution Prevention: -

“Prevention is better than cure”. We all know. So, pollution control is better than pollution prevention using environment friendly materials.

12. Safer chemistry for accident Prevention: -

The main purpose focuses on safety for the worker and surrounding community. Better to use chemical, materials that will not explode, while making product.

Teaching of green chemistry for future generation: -

The popularization of green chemistry on school, among the worker at plants of Chemical Industry. We can use social media, Internet to educate population about the beneficiary aspect of green chemistry.

II. CONCLUSION : -

Green Chemistry is a new philosophical approach that through this application green chemistry can contribute to sustainable environment. Beside this Successful Implementation of green chemistry depends on training and giving education to our new generation.

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