

Role green of chemistry in Environmental Safety-Short Review

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Abstract:

Green chemistry is also called as sustainable chemistry. It is about discovering, developing and implementation of sustainable a chemical reaction that does not create any hazardous waste and only generate ecofriendly waste. In the last decade, green chemistry has been recognized as a new approach to scientifically based environmental protection and sustainable development. The main purpose of green chemistry is to prevent pollution provides a more efficient approach to maintaining human health and also the environment than waste processing or remediation. This review represents basic principles, benefits and role of green chemistry in Environmental Safety.

Keywords : Green chemistry, ecofriendly waste, Environmental safety.

1. Introduction :

Now a day Environment Pollution is very big issue for society. Environmental Pollution results in a variety of ways. Environmental pollution caused by use of toxic substances in industrial, domestic or agricultural activities that effect on human health. The main approach of green chemistry is to achieving environmental and economic prosperity. The green chemistry utilizes the creativity of the researchers and engineers to develop novel and benign approaches to processes from the start rather than relying on regulatory restrictions after the process has been discovered to be hazardous or polluting[2]. Green chemistry is not only control environmental pollution but also reduced risk in industries. The main focus of green chemistry is to minimizing the hazard to human health and Environment and also sustainable development.

2. The Basic Principles of Green Chemistry :

Green chemistry is defined as environmentally ecofriendly chemical synthesis. Any chemical reaction, whether performed in laboratories or industries should generate none or minimum by-products which pollute the environment. According to the work of Paul T. Anastas, there are 12 principles of green chemistry have given in following Table-1 [1].

Table 1 :

The 12 principles of green chemistry :

1. It is better to prevent waste than to treat or clean up waste after it is formed.
2. Synthetic methods should be designed to maximize the incorporation of all materials used into the final product.
3. Wherever practicable, synthetic methodologies should be designed to use and

generate substances that possess little or no toxicity to human health and the environment.

4. Chemical products should be designed to preserve efficacy of function while reducing toxicity.
5. The use of auxiliary substances (e.g. solvents, separation agents, etc.) should be made unnecessary wherever possible and, innocuous when used.
6. Energy requirements should be recognized for their environmental and economic impacts and should be minimized. Synthetic methods should be conducted at ambient temperature and pressure.
7. A raw material of feedstock should be renewable rather than depleting wherever technically and economically practicable.
8. Unnecessary derivatization (blocking group, protection/deprotection, and temporary modification of physical/chemical processes) should be avoided whenever possible.
9. Catalytic reagents (as selective as possible) are superior to stoichiometric reagents.
10. Chemical products should be designed to preserve efficacy of function while reducing toxicity.
11. Analytical methodologies need to be developed to allow for real-time, in-process monitoring and control prior to the formation of hazardous substances.
12. Substances and the form of a substance used in a chemical process should be chosen so as to minimize the potential for chemical

accidents, including releases, explosions and fires.

3. Benefits of Green Chemistry :

The benefits of green chemistry reduce risks of chemical production [3]. The benefits of green chemistry shown in Fig. 1

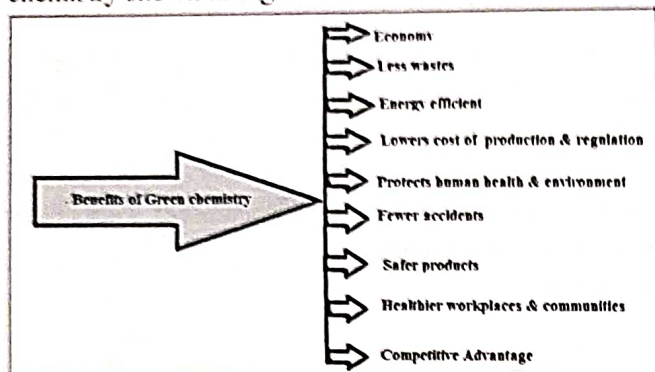


Fig.

4. Role of Green Chemistry in Environmental Safety :

Environment Pollution is caused by introduction of harmful substances from agricultural industrial or domestic activities into the environment. Harmful solvents, reagents and products are also responsible for environmental pollution. Now, Maximum environmental pollution is caused by chemical waste from industries. The cost of disposal of waste material is also enormous. Therefore, attempts have been made to design synthesis of manufacturing processes in such a way that the waste material is less, they have no effect on human health and also on environment. It is necessary to use less hazardous starting materials, solvents and catalysts for carrying out any chemical reaction [4]. The reaction should not generate any Hazardous by-products. The safety assessment of materials such as solvents used in teaching and industrial field can be of great utility in supporting pollution prevention initiatives [5-6]. Avoiding toxicity and safety hazards in chemical products and processes, in order to protect both Production workers and consumers are not only desirable environmental goals but are also important societal objectives. Moreover, the weighting of various environmental impact factors can be conducted on the basis of societal considerations [7]. The sample pretreatment, extraction could involve serious risks for the environment, the safety of operators, and the main analytical features of the methods therefore, improvement of analytical operations, used of advance technology, advancements in high specifications instruments and environmental safety is necessary [8-10]. The metals from waste water

remove by using algae, This technology could minimize costs and effects caused by the presence of heavy metals in the environment, reduction of public health risks and 100% biological process without the use of toxic chemical substances [11]. The use of green nanotechnology to maximizing benefits and minimizing harms to environment [12]. The principles and variety of metrics of green chemistry is very useful to sustainability of chemical processes [13] and the methods and metrics of green chemistry must have taught in academia is necessary [14]. Green education of chemistry teachers should more accurately reflect to the significance of education and sustainable development and also support and promote the development of human identity, which is correlated with the environment safety [15-16]. The focus on more sustainable chemistry in secondary as well as in tertiary education is mandatory to improvement in sustainable development in green chemistry [17]. There is a need for smarter regulations, higher customer awareness and demand for green solutions, investment in Green chemistry training and application [18].

4. Conclusions :

The environmental problems are faced by all countries in the world. The role of Green chemistry is use to inventing novel reactions that can maximize the desired products and minimize by-products also designing new synthetic schemes and technology that can simplify operations in chemical productions and using greener solvents that are inherently environmentally and ecologically benign. This was a very brief description of the most important changes in future industrial processes which are going to improve efficiency, minimize waste or by-products, and produce safer products and with environmental safety.

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