



# A REVIEW ON GREEN CHEMISTRY : NEED OF 21<sup>st</sup> CENTURY

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**ABSTRACT :-** Green chemistry is not politics . Green chemistry is not a public relations ploy. Green chemistry is not a pipe dream. Green chemistry is the new and rapid developing branch of chemistry. Green chemistry is an method to the design, manufacture and usage of chemical products to intentionally reduce or eliminate chemical hazards. keep natural resources on earth without using harmful materials is the prime goal of green chemistry . Green chemistry” is chemistry for environment and is really a philosophy and a way of idea what can help chemists in research and production to develop more environmentally-safe and efficient products and procedure . Green chemistry recommended the creation of chemical products and procedures that eliminate the use and production of harmful materials. The aim of green chemistry for safeguard the environment can be achieved by various methods. Some of them are biocatalysis, use of alternative repeatable raw materials (biomass), alternative reaction solution (such as ionic liquids, supercritical fluids, water), alternative reaction circumstances (microwave activation) as well as to new photocatalytic reactions . This review presents selected examples of application of green chemistry principles in everyday life .

**KEY WORD ;-** Green chemistry , Enviroment , Sustainability , Daily life application

## INTRODUCTION

Green Chemistry is explain as invention, design, development and use of chemical products and processes to reduce or to eliminate the use and generation of substances dangerous to human health and environment. The word green chemistry was first used in 1991 by Poul T. Anastas in a special program launched by the US Environmental Protection Agency (EPA) to implement sustainable development in chemistry and chemical technology by industry, academia and government. The U.S environmental law “The Pollution Prevention ACT of 1990” stated that the first choice for preventing pollution is to design industrial processes that do not lead to waste manufacture . This made the approach for green chemistry. The environmental protection agency (EPA) explain green chemistry, as the design of chemical products and processes that reduce or eliminate the use or generation of unsafe substances. This involves reduce waste products, nontoxic components and enhance efficiency.

Environmental chemistry is the chemistry of natural atmosphere and of pollutant chemicals in nature, whereas green chemistry particularly tends to decrease and avoid pollution at source. The beginning and basis of Green Chemistry for gain environmental and economic success is inherent in a sustainable world. One major element of sustainable chemistry is commonly explain as the chemical research goal at the enhance of chemical processes and products with respect to energy and material consumption, inherent safety, toxicity, environmental decline. Green Chemistry is usually presented as a set of twelve principles proposed by Anastas and Warner. The principles involve instructions for professional chemist to implement new chemical compound, and new synthesis and technological method. The idea of green chemistry is based on twelve principles that goal at lower or removing dangerous materials from the synthesis, production, and application of chemical products, and consequently the use of materials that are hazard to human health and the environment that should be lower or eliminated

## **PRINCIPLES OF GREEN CHEMISTRY :**

### **1. Prevention**

It is excellent to avoid waste than to treat or clean up waste after it has been created.

### **2. Atom Economy**

Synthetic methods should be designed in such a way to lower the incorporation of all substance used in the process into the end product.

### **3. Less Hazardous Chemical Synthesesubstances**

Wherever practicable, synthetic methods should be designed to use and create substances that possess Small or no harmful to human health and the atmosphere.

### **4. Designing Safer Chemicals**

Chemical products should be designed to affect their desired function while reduce toxicity.

### **5. Safer Solvents and Auxiliaries**

The use of auxiliary material (e.g. solvents, separation agents, etc.) should be made unneeded wherever practicable and innocuous when used.

### **6. Design for Energy Efficiency**

Energy requirements of chemical processes should be recognized for their environmental and economic effect and should be reduce. If possible, synthetic methods should be carried out at ambient temperature and pressure.

### **7. Use of Renewable Feed stocks**

A raw material or feedstock should be renewable rather than depleting whenever technically and economically practicable.

## 8. Reduce Derivatives

Unneeded derivatization (use of blocking groups, protection/deprotection, and not permanent modification of physical/chemical processes) should be lower or avoided if possible, because such steps require additional reagents and can generate waste.

## 9. Catalysis

Catalytic reagents (as selective as possible) are superior to stoichiometric reagents.

## 10. Design for Degradation

Chemical products should be designed so that at the end of their function they break down into innocuous degradation products and do not persist in the environment.

## 11. Real-time analysis for Pollution Prevention

Analytical methodologies help to be further developed to allow for real-time, in-process monitoring and control prior to the formation of dangerous substances.

## 12. Inherently Safer Chemistry for Accident Prevention

Substances and the form of a substance help in a chemical process should be chosen to minimize the potential for chemical accidents, including releases, explosions, and fires.

## APPLICATIONS OF GREEN CHEMISTRY IN DAILY LIFE :

### [A.] Green Dry Cleaning of Clothes

Perchloroethylene (perc) is the solvent most commonly help in dry cleaning clothes. Perc ( $Cl_2C = CCl_2$ ) is suspected to be carcinogenic and it pollutant ground water on its disposal. A new innovation known as micell technology is developed by Joseph De Simons, Timothy Remark and James Mc clain in which liquid carbon dioxide can be used as a safer solvent along with a surfactant to dry clean clothes. This method is now being used commercially by some dry cleaners. Dry cleaning machines have been modified for using this technology so carcinogen PERC is replaced by green solvent .

### [B ] Green building

The construction industry faces challenges due to the harmful effects of its chemicals. Green building (also known as sustainable or high-performance buildings) is a word used to explain buildings that are eco- friendly and the use of natural substances to encourage sustainability. Examples include timber framing, earth brick, bamboo systems and concrete with recycled aggregate. All of these materials can be included in green construction projects with limited long-term environmental impact as compared to conventional construction which is usually composed of concrete products. These techniques are beneficial for the environment as well as they can produce cost-effective buildings which are healthier for the occupants too. Green ventilation techniques reduce the need for traditional air conditioning by allowing natural airflow .

### [C] Bleaching of paper –

at first chlorine gas was used for this purpose but now it has been replaced by hydrogen peroxide. Hydrogen peroxide along with a appropriate catalyst which enhance its bleaching action is used.

**[D] Solution to Turn Turbid Water Clear**

Tamarind seed kernel powder, discarded as agriculture waste, is a beneficial agent to create municipal and industrial waste water clear. The current follow is to use Al-salt to treat such water. It's been found that alum will increase poisonous ions in treated water and will cause diseases like Alzheimer's.

**[E] Solar Cell**

The solar cell is most major example of green technology. It directly converts the light energy into electrical energy by the process of photovoltaics. Solar photovoltaic technology has been occurs to be one of the few renewable, low-carbon producers with both the scalability and the technological development to congregate the ever-growing global demand for electricity. The use of solar photovoltaics has been rising at an average of 43% per year since 2000. Generation of electricity from solar energy results in less consumption of fossil fuels, reduction of pollution and greenhouse gas emission

**[F] Reusable Water Bottle**

Another simple origination that can be considered green is the reusable water bottle. Drinking lots of water is healthy. Minimize plastic waste is great for the atmosphere. Hence, trendy reusable water bottles that you can refill yourself are health-promoting, eco-friendly, and green.

**[G] Solar Water Heater**

Installing a solar water heater can be a great path to cut down on energy costs at a much lower initial expense. The costs associated with the installation of a solar water heater are actually recouped much faster than the costs associated with photovoltaic technology for power generation. This is due to the enhance efficiency of solar water heating systems, as well as their lower expense when compared to the large solar array required for powering a home.

**[H] Wind Generator**

The price of a home wind generator vary greatly. Some have built their own wind generators with off-the-shelf parts from their local hardware stores. Others have purchased kits or paid for professional installation to supplement the power purchased from their local electrical grid. The power production capability of a home wind generator varies about as much as the initial expense. Many kit based generators will produce only enough power to offset 10-15% of your Home energy costs

**[I] Rainwater Harvesting System**

Rain collector systems are simple mechanical systems that connect to a gutter system or other rooftop water collection network and reserve rain water in a barrel or cistern for later nonpotable use (like watering plants, flushing toilets, and irrigation). These systems are extremely low-cost.

**[J] Insulation of House**

Based on EPA estimates, 10% of household energy usage a year is due to energy loss from poor insulation. We will get an outstanding return on investment from sealing our home to prevent energy

**CONCLUSION :**

Green Chemistry is a newer methodology that through application and execution of the principles of green chemistry can play a part to sustainable development. Green Chemistry is new philosophical approach. Application and extension of the principles of green chemistry can contribute to sustainable development. Sustainable Chemistry or Green Chemistry principles help us to make this environment contamination free. Green chemistry has to be introduced in the syllabus of the students at all levels, so that each individual is made aware to choose greener path in his or her everyday life.

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