INNOVATION IN CHEMISTRY USING GREEN CHEMISTRY

Lavina Umale
Shri Umiya Kanya Mahavidyalay Rau, Indore

ABSTRACT

The term green chemistry was coined by Paul Anastasin 1991.]The multidisciplinary nature of Green Chemistry is recognised worldwide as a route to the development of chemical products and processes with lower environmental impact. Green chemistry and sustainability have had a profound effect on the way industry wish to be perceived. To promote uptake of green and sustainable methodologies amongst the chemical and chemical-using industries requires the exemplification of green chemistry in education and training material to influence and inspire the next generation of scientists. Herein, we examine important aspect of successful graduate green chemistry courses and how the skills gained from such studies can open doors to careers in a wide cross section of chemistry related industries.

KEYWORDS

Reduce, manufacturing, Industries, Researches, Challenges, Green solvent, Atom, economy, Supercritical fluids, Analytical chemistry.

INTRODUCTION

For those whom practices chemistry in Industry, Research and education the green chemistry revolution is providing a great challenge the challenges to use three R's(Reduce, Reuse, Recycle)to save environment.With these challenges,there are an equal amount of opportunities to discover and apply new chemistry and improve the economics of goods manufactured in chemical industry. In this article which is based on his inaugural lecture at the University of York in 1998, Professor Clark reviews some of the challenges and considers some of the new and successful greener chemistry in Practice .He uses two areas of chemistry to understand the scale and extend of existing and the great opportunities of innovation in chemistry for research and application.

II. METHODS AND MATERIALS

The methods which can be used as an innovative chemistry or green chemistry are numerous which can includes use of bio pesticides,Use an alternate chemical which is less hazardous for environment, Use such chemicals which are easily biodegradable, etc. some of them on which research work is done and various scholarly articles are written are as follows:

The Role of Bio pesticides as a challenge and opportunities in the field of Agriculture: A review and study of green chemistry.Green chemistry and sustainable agriculture are inherently interwined. Farmers need green chemist to make safe and eco-friendly agriculture.In very general terms, According to US EPA, bio pesticides are pesticides derived from natural materials such as animals, plants, bacteria and minerals. The two main categories focused on this report includes insects,pherome,plant extract and oils,plant growth regulator,insect growth regulators.As noted biopesticides are often highly specific and have veryprecise modes of action. While being safe for environment. Supercritical fluids have a long history. The birth of green chemistry in early 1990's gave new role to supercritical fluids as potentially environmentally more acceptable replacements for conventional solvent in a surprisingly wide range of chemical reactions and processes.

III. RESULT AND DISCUSSIONS

Research in the field of green solvents is focused neither on industries that used solvents most nor the types of solvent that the research community believes have the best hope of reducing solvent related environmental damage those of us who are primarily motivated by a desire to reduce such damage to do well to look at the major uses of solvents to determine the problems that currently make the application less than green and focus on our research Carbon dioxide as blowing agent

Carbon di oxide as blowing agent

In 1996, Dow Chemical won the 1996 Greener Reaction Conditions award for their 100% carbon dioxide blowing agent for polystyrene foam production. Polystyrene foam is a common material used in packing and food transportation. Seven hundred million pounds are produced each year in the United States alone. Traditionally, CFC and other ozone-depleting chemicals were used in the production process of the foam sheets, presenting a serious environmental hazard. Flammable, explosive, and, in some cases toxic hydrocarbons have also been used as CFC replacements, but they present their own problems. Dow Chemical discovered that supercritical carbon dioxide works equally as well as a blowing agent, without the need for hazardous substances, allowing the polystyrene to be more easily recycled. The CO2 used in the process is reused from other industries, so the net carbon released from the process is zero.

Substitution of hazardous chemicals

In the working environment is a method to a fundamental and continued improvement of occupational health by selection and development of alternative technical processes using less hazardous chemicals or no chemicals at all. In a substitution the chemicals in the final situation must be potentially less hazardous than in the initial situation, and the difference should be as great as possible. It is especially important to avoid chemicals with long-term effects of a carcinogenic, reprotoxic, allergenic, or neurotoxic nature. Less hazardous chemicals are not necessarily harmless, so the traditional preventive measures may still have to be used, but the substitution has reduced the level of hazards. Successful substitution may, however, require technical and organizational changes. Substitution cuts the cycle of hazardous chemicals – also in the environment. Substitution of hazardous chemicals is one way to clean technology. The main problem is to get these less hazardous technical possibilities realized to a full extent in the foreseeable future.Bioremediation is a process used to treat contaminated media, including water, soil and subsurface material, by altering environmental conditions to stimulate growth of microorganisms and degrade the target pollutants. In many cases, bioremediation is less expensive and more sustainable than other remediation alternatives.[1] Biological treatment is a similar approach used to treat wastes including wastewater, industrial waste and solid waste.

Bioremediation by green chemistry:

Most bioremediation processes involves oxidation-reduction reactions where either an electron acceptor (commonly oxygen) is added to stimulate oxidation of a reduced pollutant (e.g. hydrocarbons) or an electron donor (commonly an organic substrate) is added to reduce oxidized pollutants (nitrate, perchlorate, oxidized metals, chlorinated solvents, explosives and propellants).[2] In both these approaches, additional nutrients, vitamins, minerals, and pH buffers may be added to optimize conditions for the microorganisms. In some cases, specialized microbial cultures are added (bioaugmentation) to further enhance biodegradation. Some examples of bioremediation related technologies are phytoremediation, mycoremediation, bioventing, bioleaching, landfarming, bioreactor, composting, bioaugmentation, rhizofiltration, and biostimulation.Examples and applications of green chemistry:

As starting materials Polysaccharides polymers: polymers are a very important class of compounds that have broad applications and a wide array of compounds can be exploited. They have their hazardous effects. In order to use starting materials more environmentally we must use polysaccharides as the feedstock. These are biological feedstock, and as such have the advantage of being renewable, as opposed to that feedstock which is the product of petroleum. On the other hand these have no chronic toxicity to human health and environment.

Commodity chemicals from glucose: glucose is another alternative for commodity chemicals. Using biotechnological techniques to manipulate the schkimic acid pathway (responsible for making aromatic compounds), compounds such as hydroquinone, catechol, and adipic acid, all of which are important, can be synthesized. Benzene is the starting material for these substances, by using glucose in place of benzene, can help in minimizing the use of certain reagents with certain toxicity. The conduction of synthesis in water instead of organic solvents is more beneficial.

IV. FUTURE ASPECTS

The production of diesel from vegetable oil calls for an efficient solid catalyst to make the process fully ecologically friendly. Here we can describe the preparation of such catalysts from common inexpensive sugar. This high performance catalyst,which consist of stable Sulphonated amorphous carbon is recyclable and its activity markedly exceeds that of other solid acid catalysts tested for "Biodiesel" production.

V. CONCLUSION

The Green Chemistry revolution is providing an enormous number of challenges to those who practice chemistry in industry, equal number of opportunities to discover and apply new chemistry, to improve the economics of chemical manufacturing. substances that will not involve materials harmful to the environment. chemistry that deals with the application of environmentally friendly chemical compounds in the various areas of our life such as industrial uses and many o developed by the need to avoid chemical hazards that organic and inorganic compounds had on the body of humans and animals. Life. The chemicals indu products, from plastics to pharmaceuticals. However, these industries have the potential to seriously damage our environment. Green chemistry therefore serves to promote the desiginingenvironmentally benign chemicals and chemical processes.

Green Chemistry has undoubtedly been one of the most noteworthy advancements in the chemical sciences of late and is recognised worldwide to describe the development of more sustainable chemical products and processes (Anastas and Warner, 1998). Green chemistry and sustainability have had a profound effect on the way companies wish to be perceived and now more industries are putting the issue of sustainability as a key facet of their longer term strategies. The multidisciplinary nature of green chemistry is one of the keys to its success. The combination of chemistry, chemical engineering and biology are a powerful tool for meeting the challenges for developing cleaner processes. The emergence of Green Chemistry Centres in rapidly developing countries is also highly valuable as they have a wealth of natural resources and waste that could be exploited to produce valuable chemicals, materials and fuels. To realise this potential will require people with sustainability training.

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