

## Green Chemistry

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'Green Chemistry' is the new branch of chemistry which involves pulling together tools, techniques and technologies. It is helpful to chemists and chemical engineers in research, development and production for development of more eco-friendly and efficient products which may also have significant financial benefits. It is now going to become an essential tool in the field of synthetic chemistry. The development of Green Chemistry redefines the role of a solvent: "An ideal solvent facilitates the mass transfer but does not dissolve". In addition, a desirable green solvent should be natural, nontoxic, cheap and readily available with additional benefits of aiding the reaction, separation or catalyst recycling.

Green chemistry efficiently utilizes (preferably renewable) raw materials, eliminates waste, and avoids the use of toxic and/or hazardous reagents and solvents in the manufacture and application of chemical products. Raw materials include, in principle, the source of energy, as this also leads to waste generation in the form of carbon dioxide. Green Chemistry is primary pollution prevention rather than waste remediation.

A traditional concept in process chemistry has been the optimization of the time-space yield. From our modern perspective, this limited viewpoint must be enlarged, as for example toxic wastes can destroy natural resources and especially the means of livelihood for future generations. In addition, many feedstocks for the production of chemicals are based on petroleum, which is not a renewable resource. The key question to address is: what alternatives can be developed and used? In addition, we must ensure that future generations can also use these new alternatives. "Sustainability" is a concept that is used to distinguish methods and processes that can ensure the long-term productivity of the environment, so that even subsequent generations of humans can live on this planet. Sustainability has environmental, economic, and social dimensions.

Imagine a world in which – instead of toxic solvents and chemicals – industrial manufacturing used sugar, starch and sunlight as inputs. Imagine products that biodegrade into utterly benign substances. Imagine pure, clean water leaving factories and polluted sources brought back to life. What if industrial chemicals were bio-based and generated by farmers practicing sustainable agriculture? Imagine a workplace free of "hazmat" gear, factories without scrubbers, and a world where CO<sub>2</sub> is used as a valuable industrial input rather than emitted as a green house gas. Green Chemists are making this vision a reality.

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