GREEN, SAFE AND SUSTAINABLE CHEMISTRY:REPOSITIONING CHEMISTRY AS A CENTRAL SCIENCE

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Abstract

Environmentally friendly and benign chemistry is key to the continuance of chemical science as a central science. These are four dimensions to environmentally friendly and benign chemistry, namely Green Chemistry, Safe Chemistry, Affordable Chemistry and Sustainable Chemistry. Although these dimensions are integral to the twelve principles of green chemistry (principles 2,4,10,12), very often, the emphasis appears to be mostly on issues such as use of catalyst, atom economy, use of less hazardous reagents etc. In this lecture, we point out that, a more holistic approach to environmentally benign and sustainable chemistry is needed, if we have to reposition chemistry as a central science. Such holistic approach to the problem of sustainability comes with many challenges since not all factors contribute to a positive impact on each of the dimensions. For example an elegant green chemistry approach focused only on the reaction pathway may be too expensive and/or economically viable. Similarly use of a renewable feedstock may lead to uninted consequences on the environment and could lead to unsustainable practices in agriculture. The complexity of the challenge is evident from the fact that in spite of numerous instances in published literature, very few chemistry has been adapted in industrial practice. The lecture will analyze these challenges and define issues that need to be carefully assessed and addressed before chemistry becomes truly green, safe and sustainable.