

Research Perspective in Academia and Generic Pharmaceutical Industry

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Editorial

Research per say is an exploratory endeavor that allows us to discover or invent not only medicine and material but how to make them in sustainable manner. In particular, research primarily involves identification of the target and its significance in terms of applicability to meet the societal needs ranging from education to commercial production of the goods.

In most of the cases, academic research in the field of synthetic organic chemistry across the globe focuses on the generation of proof of concept that can further be advanced for scale up or scale out. Due to easily available reagents and solvents which fit in the game plan, most of the academicians/researchers recommend/exercise the best possible synthetic protocol (not necessarily Green) to accomplish the synthesis either preceded or unprecedented manner. It was rare occasion when meaningful academic research directed to develop sustainable and cost effective routes in a speedy manner. It would have been great news if we would have earned our education and carried the legacy to practice best possible chemistry during teaching and execution in a Greener fashion. At the same time we cannot ignore rather we must acknowledge and accolade the synthetic advances made by researchers that are being floated and will remain increasing in astonishing pace in the myriad of scientific journals. Academic research provided a remarkable foundation for fundamental discoveries and commercial production of goods in all industrial sectors that entire humanity got benefited. Another fascinating aspect of the research is that it allows the concept to evolve as evident in the advancement of organometallic chemistry starting from Grignard coupling (even before) to Palladium catalyzed carbon-carbon or carbon-heteroatom bond formation. These two fundamental inventions and their applications to impact society brought two Noble Prizes to the respective scientists.

Active pharmaceutical ingredient (API) is a responsive component in the medication for eliciting pharmacological activity in the patients. A myriad of chemical entities that have been discovered for treating the several diseases were found to be unaffordable due to high cost incurred in the discovery, process and manufacturing. Although the recent worldwide advances in the drug discovery and process research have made significant impact on all walks of life and have revolutionized the pharmaceutical industries but at the same time we realized that the healthcare, as a societal need, is still facing daunting yet not insurmountable challenges due to the emergence of resistant pathogens against existing medicines, environmental pressure and cost of the medications.

Genericization of life saving medicines offers great opportunities to the pharmaceutical companies to further commence research and development activity to bring down the cost of APIs without compromising the quality and make them available to under privileged society at an affordable price.

API R&D department deals with the innovative and cost effective development of pharmaceutically active ingredients by practicing the recent advances in science and technology. R&D department may comprise of world class skilled scientists and state of the art facilities amenable to yield products of global standards. Productive and meaningful research in generic pharmaceutical industry is not a cake walk as it imposes high degree of challenges due to cut throat competitions. Molecules that the scientists in generic API, R&D section handle are beaten up to the pulp and each and every player in this sector is trying their level best to touch the rock bottom price. In this scenario, one has to devise such chemistry and process that should be innovative, robust and Green amenable to meet all the regulatory and business requirements. Moreover, Green philosophy connects the sustainability with the economy of any business set up.

Green chemistry is the best way of practicing chemistry which is gaining momentum in generic pharmaceutical industry. Considering the amount of waste (high E factor) that a pharmaceutical industry generates along with the synthetic useful material, Green chemistry is not only conceived as a branch of chemistry but it has now become one of the essential components in the process research and development. The trivial and suboptimal way of practicing chemistry is the main root cause of waste problem in the pharmaceutical industry today. Revisiting and redesigning the synthetic routes in order to have greener route might bring tangible and sustainable solution to an environmental problem. Greener routes are always cost effective since it does not allow the formation of by products and quite often affords products in high yield at the cost of least resources.

Working in the pharmaceutical industry particularly in generic section provides a great deal of satisfaction as your fundamental knowledge in chemistry is not only limited to explore synthetic aspects on model substrates but it also allows us to practice chemistry understanding on life saving medicines to make them available to weaker section of the society.

Had the best chemistry been developed at the point of origin we could have avoided the stern environmental burden due to the high pharmaceutical E factor up to great extent. I think that the extraordinary Industry-Academia collaboration at every level of drug development may fill the gap that would inevitably help us to move towards sustainability.

Finally, I draw a conclusion, "Making simple thing simpler is much more difficult than making difficult thing simple".

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