Scalable Continuous Flow Synthesis of Pharmaceuticals and Agrochemicals

Problem Statement: At present, India's pharmaceutical and agrochemical industry does not synthesise valuable oxazole compounds using the continuous flow method. The continuous flow methodology will help industries produce different heterocycles on the bulk scale in a safer manner, which will be cost-effective and strengthen industrial productivity. Synthesis of oxazole based pharmaceuticals, agrochemicals and natural products have been previously reported by using transition metal protocol under high temperature. These methodologies suffer from poor yield along with ketazines formation as a byproduct. Safety and scalability are two major concerns to date. Overcoming these limitations, researchers at IIT Bombay have streamlined the strategy for the synthesis of oxazole-based pharmaceuticals, agrochemicals and natural products by continuous flow method.

Uniqueness of the Solution: This project deals with the development of methodology using continuous flow reactors where the reaction will occur in micro-channels in the presence of visible light and mass transfer among the molecules giving a short reaction time. Fully optimised flow reactor methodology is used to prepare the complex oxazole compounds on a kilogram scale with minimal post-synthetic work-up, unlike batch processes.

Current Status of Technology: Researchers have designed a prototype assembling flow reactors and successfully synthesised oxazole molecules containing both aromatic and aliphatic donor-acceptor/acceptor-acceptor diazo carbonyl or diazoacetate compound with readily available nitrile source.

Societal Impact: Targeting a novel pathway that controls fat circulation in blood could help us control the epidemic of obesity, diabetes and accompanying maladies.

Patent(s): In progress

Relevant Industries: Pharma and Agrochemical industries.

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