

Chemists have an immense responsibility to assist in solving a wide range of current, or even unforeseen, social and global problems associated with health, materials, food, energy, environment, and many others. The need for efficient and practical Chiral catalysis remains one of the greatest intellectual challenges which chemists have to face in the 21st Century. The advanced chemical process of the future needs to be economical, safe, environmentally benign, and resource- and energy-saving. The objective of the work is to develop new environmentally benign methodologies for chiral synthesis. Thus two approaches have been used to achieve these objectives, incorporation of Biocatalytic methods and enantioselective Organocatalysis in organic transformations. It is our endeavor to develop methodologies that employ water as a solvent or are free from organic solvents.

Select recent publications:

1. Small organic molecule catalyzed enantioselective direct aldol reaction in water. S S Chimni and D Mahajan *Tetrahedron: Asymmetry* **2006**, *17*, 2108-2119.
2. Biodegradation of an Azo dye C.I. Acid Red-88 by an anoxic-aerobic sequential bioreactor. M S Khehra, H S Saini, D K Sharma, B S Chadha & S S Chimni *Dyes and Pigments*, **2006**, *70*, 1-7
3. Electron Deficiency of Aldehydes Controls the Pyrrolidine Catalyzed Direct Cross-Aldol Reaction of Aromatic/Heterocyclic Aldehydes and Ketones in Water. S S Chimni, D. Mahajan *Tetrahedron*, **2005**, *61*, 5019-5024.
4. Protonated Chiral Prolinamide Catalyzed Enantioselective Direct Aldol Reaction in Water. S S Chimni, D. Mahajan, V. V. Suresh Babu *Tetrahedron Letters* **2005**, *46*, 5617-5619.
5. Decolorization of various azo dyes by bacterial consortium. M S Khehra, H S Saini, D K Sharma, B S Chadha & S S Chimni *Dyes and Pigments*, **2005**, *67*, 55-61.