Research Profile

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Academic Background:

- **M.Sc.** (2000): Chemistry, from the Department of Chemistry, University of Pune
- **Ph.D.** (2006): National Chemical Laboratory (NCL), Pune
- **Post-Doctoral Fellowship** (2006-2008): University of Bologna, Italy

Broad Research Interests: Organocatalysis, Sustainable Chemistry, Synthetic Methodologies

⇒ Development of proline-based organocatalysts for asymmetric C-C bond forming transformations

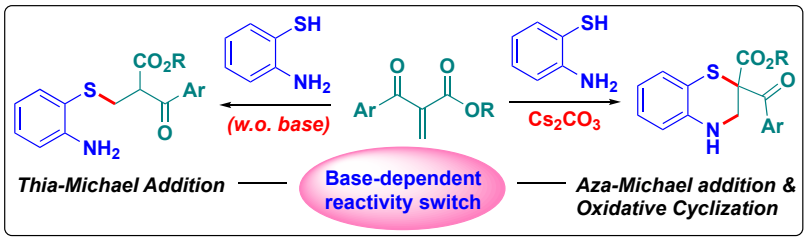
⇒ Bifunctional organocatalysis – enantioselective cascade cyclisations for the construction of fused and bridged ring systems

⇒ Sustainable synthetic methodologies related to the Baylis-Hillman reaction, Michael addition, etc.

Recent Research Highlights

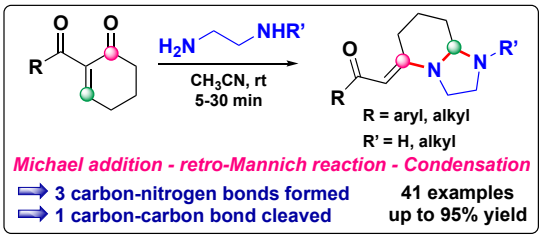
➢ ***Novel transformations of "Morita-Baylis-Hillman ketones"***

Mechanistic Investigations on the Interaction of Morita–Baylis–Hillman Ketones with 2-Aminothiophenol



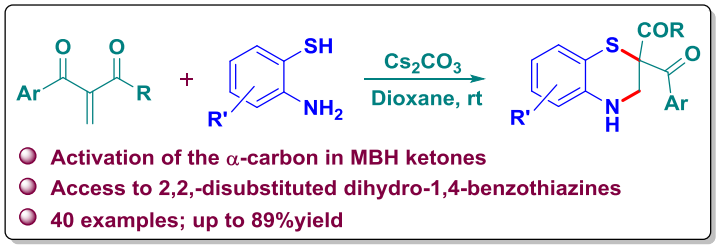
J. Org. Chem. 2024, (*revision*)

A retro-Mannich mediated transformation of MBH Ketones to Saturated Imidazo[1,2-a]pyridines



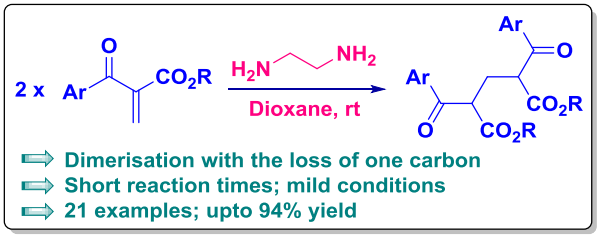
Manuscript communicated

Oxidative annulation of MBH ketones to access dihydrobenzothiazines



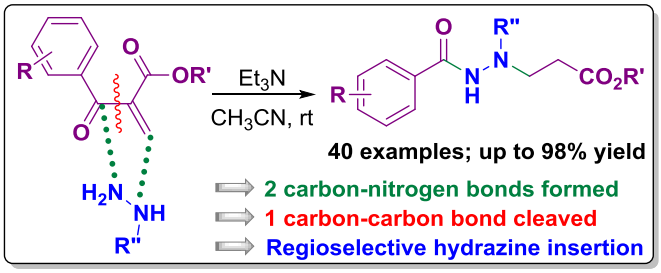
J. Org. Chem. 2022, *87*, 5760

Diamine mediated degradative dimerization of MBH ketones



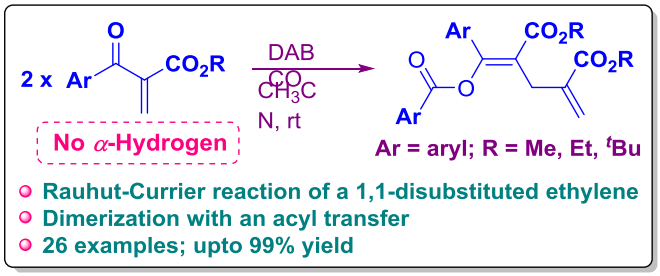
Chem. Commun. 2020, *56*, 2949

Access to benzohydrazides via a unique hydrazine insertion



Org. Lett. 2019, *21*, 8191

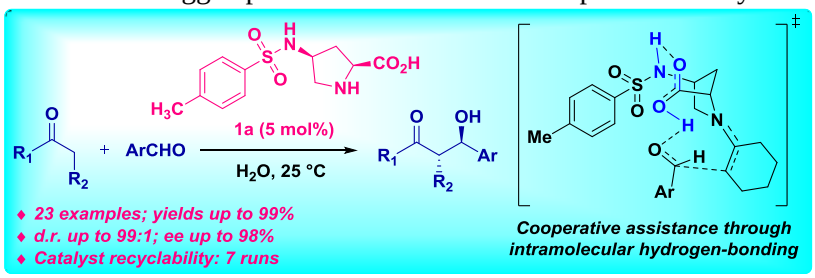
Acyl-transfer driven Rauhut-Currier dimerization of MBH ketones



J. Org. Chem. 2023, *88*, 2023

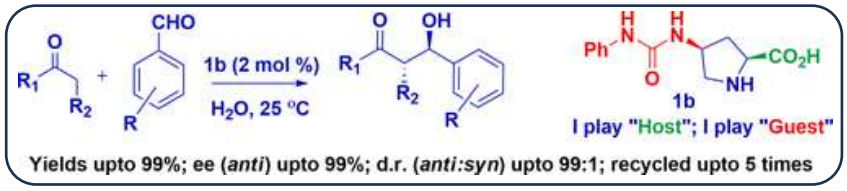
➢ *Asymmetric Organocatalysis*

- A sulfonamide-tagged proline as a bifunctional cooperative catalyst for the asymmetric aldol addition



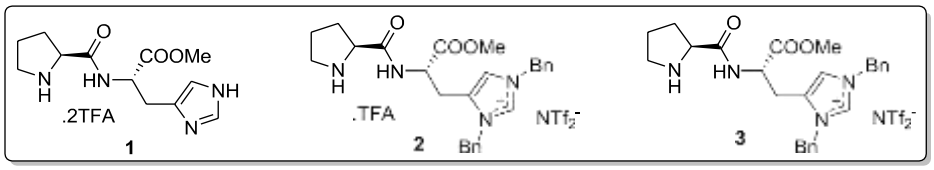
New J. Chem. 2023, *47*, 17042

- A Urea-tagged proline as a synergistic catalytic model for the direct asymmetric aldol reaction



J. Org. Chem. 2018, 83, 8225

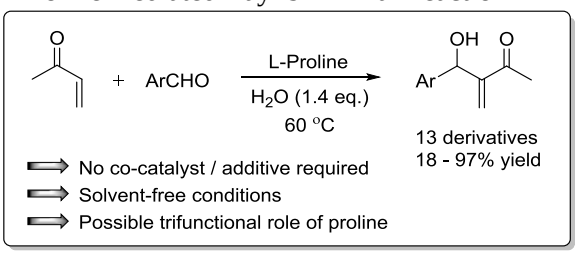
- Dipeptide based catalysts (*Pro-His and Pro-Arg derived catalysts*)



SYNTHESIS 2021, 2702

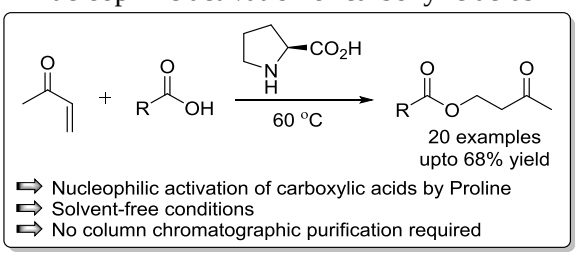
➢ *Examples of methodologies based on harnessing the synthetic potential of methyl vinyl ketone*

Proline mediated Baylis-Hillman reaction



Synlett 2017, *28*, 128

Nucleophilic activation of carboxylic acids



Synlett 2017, *28*, 1477

GRANTS & RESEARCH FUNDING

- Research Grants received from MoE STARS, SERB, DST, CSIR and UGC, India, with a total funding > Rs. 1.5 crore

- Two collaborative projects carried out in collaboration with **RFBR, Russia** (*with Prof. Sergei Zlotin, Zelinsky Institute of Organic Chemistry, Moscow*) and **Academy of Finland** (*with Prof. Petri Pihko, University of Jyvaskyla, Finland*)

Details of Research Projects

***Projects In progress*:**

1. **SERB – CRG**: Investigation of Diverse Reactivity Patterns in Morita–Baylis–Hillman Ketones to access Biologically Significant Heterocyclic Scaffolds
   Duration: 2023-'26; Sanction: ~Rs. 35 lakhs

2. **MoE-STARS**: Exploring Conformationally Constrained and Cooperatively Assisted Bifunctional Organocatalysts for Enantioselective Mannich / Michael Addition Reactions
   Duration: 2023-'26; Sanction: ~Rs. 22 lakhs

***Projects completed*:**

1. **SERB – CRG**: Studies on the organocatalytic enantioselective construction of tetrahydroxanthenones
   Duration: 2019-'22; Sanction: ~Rs. 43 lakhs

2. **CSIR – EMR**: Design of Novel Bifunctional Amine-Urea/Thiourea Catalysts for Asymmetric C-C Bond Forming Applications
   Duration: 2018-'21; Sanction: ~Rs. 28 lakhs

3. **DST – Academy of Finland Collaborative Project** – "Studies on the Asymmetric Mannich and Michael Addition Reactions Catalyzed by a Folding Bifunctional Organocatalyst"
   In collaboration with and in the laboratory of ***Prof. Petri Pihko****, University of Jyvaskyla, Finland*
   Duration: Aug-Oct 2019; Mobility Grant of Rs. 1 lakh

4. **DST-RFBR Indo-Russian Collaborative Project** – "Synthesis and studies on catalytic performance of novel ion-tagged recyclable chiral organocatalysts generated from suitable dipeptides"
   In collaboration with ***Prof. Sergei Zlotin****, Zelinsky Institute of Organic Chemistry, Moscow*;
   Duration: 2014-'16; Sanction: ~26 lakhs

5. **UGC Start-up**: Studies towards the total synthesis of protoberberine based natural products
   Duration: 2015-'17; Sanction: Rs. 6 lakhs

Significant publications (*recent*)

- Mechanistic Investigations on the Interaction of Morita–Baylis–Hillman Ketones with 2-Aminothiophenol
  R. Kumari, A. K. Jha, A. G. H. Khan and **S. Easwar***, ***J. Org. Chem.* 2024 (*revision*)**

- Cooperative assistance of a sulfonamide in a proline-mediated direct asymmetric aldol addition; K. Kumari, M. Bhati, R. S. Madhukar, A. G. H. Khan, P. Janjani, S. R. Reddy and **S. Easwar***, ***New J. Chem.* 2023, *47*, 17042-17050**.
  https://doi.org/10.1039/D3NJ02685J

- Acyl Transfer Driven Rauhut–Currier Dimerization of Morita–Baylis–Hillman Ketones
  R. Kumari, A. K. Jha, S. Goyal, R. Maan, S. R. Reddy and **S. Easwar***, ***J. Org. Chem.* 2023, *88*, 2023-2033**.
  https://doi.org/10.1021/acs.joc.2c02244

- Synthesis of 2,2-Disubstituted Dihydro-1,4-benzothiazines from Morita−Baylis−Hillman Ketones by an Oxidative Cyclization
  A. K. Jha, R. Kumari and **S. Easwar***, ***J. Org. Chem.* 2022, *87*, 5760-5772**.
  https://doi.org/10.1021/acs.joc.2c00087

- Proline-Histidine Dipeptide: A Suitable Template for Generating Ion-tagged Organocatalysts for the Asymmetric Aldol Reaction
  H. Inani, A. Singh, M. Bhati, K. Kumari, A. S. Kucherenko, Sergei G. Zlotin* and **S.Easwar***, ***Synthesis* 2021, *53*, 2702-2712**.
  doi: 10.1055/a-1477-4871

- Diamine-Mediated Degradative Dimerisation of Morita-Baylis-Hillman Ketones
  A. K. Jha, A. Kumari and **S. Easwar***, ***Chem. Commun.* 2020, *56*, 2949-2952**.
  https://doi.org/10.1039/C9CC10068G

- A Hydrazine Insertion Route to N'-Alkyl Benzohydrazides by an Unexpected Carb0n-Carbon Bond Cleavage
  A. K. Jha, R. Kumari and **S. Easwar***, ***Org. Lett.* 2019, *21*, 8191-8195**.
  https://doi.org/10.1021/acs.orglett.9b02657

- Probing the Synergistic Catalytic Model: A Rationally Designed Urea-Tagged Proline Catalyst for the Direct Asymmetric Aldol Reaction
  M. Bhati, K. Kumari and **S. Easwar***, ***J. Org. Chem.* 2018, *83*, 8225-8232**.
  https://doi.org/10.1021/acs.joc.8b00962

Awards

- "*Prof. D. K. Banerjee Memorial Lecture Award*" at **Indian Institute of Science, Bangalore**, *Apr 2023*

Invited Lectures at Conferences (*recent*)

- International Conference on "Emerging Trends in Catalysis and Synthesis (ETCS) at **IIT Kharagpur**, *Mar 2024*
- Indo-French Conference on "Fostering Catalysis for Societal Benefit (FCSB)" at **University of Hyderabad**, *Jan 2024*
- International Conference on Organometallics and Catalysis (ICOC), Goa, *Oct-Nov 2023*
- International Conference on "Recent Advances in Chemical Sciences" at **Central University of Jammu**, *Nov 2022*
- Annual Symposium "*Interactions 2022*", **IISER Bhopal**, *Mar 2022*
- Invited Expert Lectures in the Workshop on "*Spectroscopic Techniques for Materials Characterization*", **MNIT Jaipur**, *Jan 2021*
- Invited talk at the Department of Chemistry, **University of Bologna, Italy** on "*The Morita-Baylis-Hillman Ketone – A Pandora's Box of Reactivity*", *Oct 2019*
- Invited talk at the **Karolinska Institute, Stockholm, Sweden** on "*Asymmetric Organocatalysis and the Morita-Baylis-Hillman Reaction: Diverse Tools towardsBiologically Active Targets*", *Sep 2019*