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RESEARCH AREAS

- *Asymmetric Synthesis*
- *Domino Reactions*
- *Arene Functionalizations*
- *Green Protocols in Organic Synthesis*
- *Carbohydrate Research*
- *Antibacterial Activity Studies*
- *Purification and structure determination of proteins*

RESEARCH HIGHLIGHTS

- The group has developed various asymmetric organocatalysts from naturally available proline and derivatives of camphor-10-sulfonic acid and glucosamines. The catalytic activity of these organocatalysts has been investigated in various asymmetric transformations.
- Novel sugar derivatives were synthesized.
- Developed green protocols for the synthesis of an array of heterocycles under solvent-free and catalyst-free conditions. Synthesized several vesicular acetylcholine transporter inhibitors.
- Highly unstable *o*-benzoquinone monoimines were chemically generated for the synthesis of hitherto unknown 1,4-benzoxazine derivatives.
- A plethora of halogenated bicyclo[2.2.2]octenones were synthesized.

SELECTED PUBLICATIONS

Recent papers

- S. K. R. Parumala, S. R. Surasani, R. K. Peddinti
S-Arylation of thiols with masked *o*-benzoquinones: Synthesis of alkyl aryl/diaryl sulfides.
New J. Chem. **2014** (DOI: 10.1039/c4nj01381f)

- S. R. Surasani, S. K. R. Parumala, R. K. Peddinti
Diels-Alder reactions of 4-halo masked *o*-benzoquinones. Experimental and theoretical investigations.
Org. Biomol. Chem. **2014**, *12*, 5656-5668.
- R. T. Naganaboina, A. Nayak, R. K. Peddinti
Expedient synthesis of novel 1,4-benzoxazine and butenolide derivatives.
Org. Biomol. Chem. **2014**, *12*, 3366-3370.
- G. Choudhary, R. T. Naganaboina, R. K. Peddinti
Expedient synthesis of novel 1,4-benzoxazine and butenolide derivatives.
RSC Advances **2014**, *4*, 17969-17979.
- S. K. R. Parumala, R. K. Peddinti
Reversal of polarity in masked *o*-benzoquinones: Rapid access to unsymmetrical oxygenated biaryls.
Org. Lett. **2013**, *15*, 3546-3549.
- R. T. Naganaboina, R. K. Peddinti
BF₃.etherate mediated Friedel-Crafts alkylation of arenes with 2-hydroxy-1,4-benzoxazines: Synthesis of 2-aryl-1,4-benzoxazine derivatives.
J. Org. Chem. **2013**, *78*, 12819-12824.
- J. Agarwal, R. K. Peddinti
Synthesis and characterization of monosaccharide derivatives and application of sugar-based prolinamides in asymmetric synthesis.
Eur. J. Org. Chem. **2012**, 6390-6406.
- N. Bodipati, R. K. Peddinti
Hypervalent iodine mediated synthesis of carbamate protected *p*-quinone monoimine ketals and *p*-benzoquinone monoketals.
Org. Biomol. Chem. **2012**, *10*, 4549-4553.
- N. Bodipati, R. K. Peddinti
Chemical generation of *o*-quinone monoimines: Rapid construction of novel 1,4-benzoxazine derivatives.
Org. Biomol. Chem. **2012**, *10*, 1958-1961.
(Hot paper)
- G. Choudhary, R. K. Peddinti
Introduction of a clean and promising protocol for the synthesis of Michael adducts and 1,4-benzoheterocycles: An emerging innovation.
Green Chem. **2011**, *13*, 3290-3299.
- J. Agarwal, R. K. Peddinti
Glucosamine-based primary amines as novel organocatalysts for the asymmetric aldol reaction.
J. Org. Chem. **2011**, *76*, 3502-3505.
- G. Choudhary, R. K. Peddinti
Towards absolute green protocol: An expeditious, highly efficient, catalyst-free and solvent-free synthesis of nitroamines and nitrosulfides by Michael addition.

Green Chem. **2011**, *13*, 276-282.

- R. Rani, R. K. Peddinti
Michael reaction of ketones and β -nitrostyrenes catalyzed by camphor-10-sulfonamide-based prolinamide
Tetrahedron Asymm. **2010**, *21*, 2487-2492.
- J. Agarwal, R. K. Peddinti
Sugar-based novel organocatalysts: Enantioselective aldol reactions of cycloalkanones with aromatic aldehydes.
Tetrahedron Asymm. **2010**, *21*, 1906-1909.
- R. Rani, R. K. Peddinti
Camphor-based novel organocatalysts: Enantioselective aldol reactions of cycloalkanones with aromatic aldehydes.
Tetrahedron Asymm. **2010**, *21*, 775-779.
- C.-C. Liao, R. K. Peddinti
Chapter 4 (1,2-Naphthoquinones including 1,5-, 1,7-, 2,3-, 2,6-naphthoquinones) in *Science of Synthesis: Houben-Weyl Methods of Molecular Transformations*, Volume 28 (Quinones and Heteroatom Analogs), **2006**.

PROJECTS COMPLETED

1. Asymmetric Organocatalysis with L-Proline and its Derivatives.
Nov. 2005 – Feb. 2009, DST.
2. Novel α,α -Diarylprolinol-derived Chiral Ligands for Catalytic Asymmetric Synthesis.
CSIR, Apr. 2006 – Sept. 2009.
3. Dearomatization of 3-Methoxy-2-naphthol: Synthesis of Benzannulated Bicyclo[2.2.2]octenone Frameworks.
MHRD, Apr. 2007 – Mar. 2008.
4. Novel Methodologies for the Generation of *o*-Benzoquinone Monoimides: Synthesis of 1,4-Benzoxazine Derivatives.
CSIR, Oct 2009 – Mar. 2013.
5. Microwave Heating Technology: A Green Chemistry Approach for Functionalization of Arenes.
MHRD, May 2010 – Apr. 2013.

ONGOING PROJECTS

1. Domino Reactions and Asymmetric Organocatalytic Reactions.
DST, Jun. 2012 – May. 2015.

GROUP MEMBERS (Ph.D.)

1. Rashmi Rani (Graduated in 2011)
2. Garima (Graduated in 2011)
3. Jyoti Agarwal (Graduated in 2011)
4. Seshi Reddy Surasani (Graduated in 2011)
5. Naganjaneyulu Bodipati (Graduated in 2012)
6. Ram Tilak Naganaboina (Graduated in 2014)
7. Jyoti Singh Tomar (2010-)
8. Santosh Kr. Reddy Parumala (2011-)
9. Arun Sharma (2011-)
10. Ujjawal Kumar Bhagat (2011-)
11. Shivangi Sharma (2011-)
12. Pallavi Singh (2012-)
13. Balakrishna Aegurula (2013-)
14. Neha Taneja (2013-)
15. Shweta Bisht (2013-)
16. Nitika Sharma (2013-)
17. Piyush Tehri (2014-)

PROJECT FELLOWS

1. Srinivasa Rao Palla (Biological Activity Studies)

M.Tech.

1. Hemkant Saini (2013-)
2. Pravin Kumar (2013-)

PREVIOUS GROUP MEMBERS (M.Sc. & M.Tech.)

M.Sc.	Year of Graduation	M.Tech.	Year of Graduation
Anjali Jha	2005	Virendra Singh Rajora	2006
Sudarshana Mukherjee	2005	Mahesh Chander Singh	2007
Sujata Kashyap	2005	Deepika Kanwar	2008
Garima Singh	2006	Bhaskara Rao Pasumarti	2010
Jissy A. K.	2006	Monika Das	2011
Anju Duley	2007	Ankita Singh	2013
Shankha Pattanayak	2007	Ankur Singhal	2014
Dipankar Sahoo	2008		
Farhana Shehla	2008		
Sunil Kumar Bonagani	2009		
Nithish Kumar Verma	2012		

Oishika Panda	2012		
Donthi Murali	2013		
Shikha Sharma	2014		

RESEARCH FACILITIES

The research group is well equipped with basic facilities to perform reactions for organic synthesis/ asymmetric synthesis. Laboratory has facilities to carry out reactions under inert atmosphere and at low temperatures up to $-90\text{ }^{\circ}\text{C}$. It also procured HPLC instrument along with chiral columns.

In addition, instruments such as FT-IR, UV-Vis, GC, GC-MS, HRMS, CHN analyzer, *etc.*, are available in the Department and 500 MHz NMR and XRD instruments are available in the Institute Instrumentation Centre.

FURTHER DETAILS OF THE GROUP

For further details of the group, visit the following sites

<http://people.iitr.ernet.in/facultywebsite/rkpedfcy/Website/>

http://www.iitr.ernet.in/departments/CY/pages/Research+Facilities+Labs+Asymmetric_Synthesis_Lab.html