

## **Professor Rina Ghosh**

### **BIODATA**

**1. Orchid iD:** 0000-0002-6506-5089

**2. Last affiliation:** Professor of Chemistry, Jadavpur University, Kolkata

**3. Permanent Address:** 1 Nabanagar, Jadavpur, Kolkata 700032, India.

**4. Date of Birth:** 01.12.1957.

#### **5. Educational Qualifications:**

- Awarded the Ph.D.(Sc.) degree from Jadavpur University in 1986.[Thesis title:Structural aspects Carbohydrate materials Isolated from plant and fish].
- Passed M.Sc. Examination (Organic Chemistry as special paper) from Jadavpur University in 1979 with 1<sup>st</sup> class (66.1%).
- Passed B.Sc. Examination from Jadavpur University in 1977 with 1<sup>st</sup>Class (63%) in Chemistry (Hons).
- Passed Higher Secondary from WBSE with 1<sup>st</sup>Division (71.3%,awarded National scholarship) in 1974 (with Science group).

#### **6. Award/Prize:**

Awarded the National Scholarship during Graduate and Postgraduate studies.

#### **7. Research Experience:**

- 1993 to 2022(research along with graduate and post-graduate teaching)
- Pool officer (CSIR) [No.13/6316-A/91-pool]in the Dept. of Chemistry, Jadavpur University during the period Sept. 19, 1991 to June 30, 1992.
- Research Associate II in the Dept. of Biological Chemistry, IACS, Kolkata during Aug.21, 1989 to Aug. 20,1991.
- Research Associate, CSIR in the Dept. of Chemistry, Jadavpur University during the period March 9, 1987 to August 21, 1989.
- Senior Research Fellow in the Dept. of Chemistry, Jadavpur University during the period January 5, 1985 to March 7, 1987.
- Junior Research Fellow in the Dept. of Chemistry, Jadavpur University during the period February 16, 1981 to January 4, 1985.

## 8. Teaching Experience:

### (a) Permanent:

- Professor of Chemistry, Jadavpur University, October 1, 2008 to November 30, 2022.
- Reader in Chemistry at Jadavpur University for the period September 19, 2000 to September 30, 2008.
- Lecturer in Chemistry at Jadavpur University for the period January 20, 1998 to Sept. 18, 2000.
- Lecturer in Chemistry at Tripura University for the period April 3, 1995 to January 19, 1998.
- Lecturer in Chemistry at Bolpur College for the period July 1, 1992 to April 1, 1995.

### (b) Visiting Professor:

- Post graduate teaching in the Department of Chemistry, Scottish Church College.
- Post graduate teaching in the Department of Chemistry, Tripura University.
- M.Phil. teaching on Glyco science in the Department of Chemistry, West Bengal University of Technology.
- Post graduate teaching at NIPER, Kolkata.

## 9. Other notable academic/administrative duties:

- Acting as In-Charge, Organic Chemistry Section, Jadavpur University, May 02, 2005- May 01, 2007.
- Organised Refresher Course in Chemistry as Coordinator, January 02-22, 2014, Dept. of Chemistry, Jadavpur University.
- Acting as Coordinator, UGC-CAS-II program in Chemistry (2015 to 2018), Jadavpur University

**10. Research fields:** Lewis acid catalyzed organic reactions, Development of regio-, chemo- and stereo selective methods in organic synthesis with special reference to carbohydrate field, One-pot synthesis of biologically potent heterocycles, Studies on soft matters including organogelators and the corresponding gels, Synthesis of oligosaccharides related to bacterial polysaccharides, Studies on Chemosensors

**11. No. of scholars awarded Ph.D. degree:** 13

## 12. Other external responsibilities:

**(a) Member of the Editorial Board of journal:** Carbohydrate Research

**(b) Member (external) of the Management Committee** (2014 to 2015), Indian Association of the Cultivation of Science (IACS), Kolkata 700032.

**(c) Acting as Referee for reviewing manuscripts of reputed national and international journals:**

J.Org.Chem.;Org.Lett.;J.Am.Chem.Soc.;Synthesis;Synlett;Tetrahedron.Lett.; Tetrahedron; Bioorg. Med. Chem.; Chem. Commun., Soft Matter, Org. Biomol. Chem.; J. Mol. Cat. A (Chem); Catalysis Comm.; Eur. J. Org. Chem.; Chem. Asian J.; Arkivoc; Beilstein J. Org. Chem., Carbohydrate Research; Indian J. Chem.; JICS, JSST,*etc.*

### 13. Major Research Projects:

*As Principal investigator:*

**Completed:**

1. "Enantioselective synthesis of cyclopropanes, aziridines and oxiranes using carbohydrate chiral auxiliaries"-**CSIR** Scheme No.01/1463/97/EMR-II,1997-2001.(Total~Rs.9 Lacs)
2. "Aqua compatible Lewis acids in organic synthesis with special reference to carbohydrate field"-**CSIR** scheme No. 01/1672/00/EMR-II, Dec. 2000 to Mar. 2004. (Total ~Rs. 7 Lacs).
3. "Synthesis of the oligosaccharides related to the O-antigen of *Escherichia coli* of types 8, 78 and 111 and their immunochemical studies"-**CSIR** scheme No.01/1951/04/EMR-II, Jan. 2005-Dec. 2007.-implemented on Feb. 14, 2005. (Total ~Rs. 6Lacs).
4. "Low molecular mass organogelators (LMOGs) with special reference to carbohydrate field"-**DST** scheme No. SR/S1/OC-28/2006 dt. 25.01.07 (Total Rs. 12.06 Lacs).
5. "Studies on carbohydrate synthesis with special reference to the synthesis of oligosaccharides related to bacterial lipopolysaccharide of *Pseudomonas aeruginosa*" **CSIR** scheme No.01/2382/10/EMR-II dt. 07/06/2010 (Total Rs. 13 Lacs).
6. "Studies On Carbohydrates With Special Reference To Glycosylation Reactions And Synthesis Of Oligosaccharides Related To Bacterial O- and K-antigens", **DST-SERB** scheme No. SR/S1/OC-61/2012 dt. Dec. 05, 2012 (Total Rs. 25 Lacs).
7. "Synthesis of oligosaccharides .....bacterial antigens", **CSIR**, Scheme No. No.02/0186/14/EMR-II, Total Rs. 8.5 Lacs + amount for scholar. Oct 2014-Sept. 2017.
8. As PI in **collaboration**. "Studies on Anti-thyroidal .....bamboo-shoots of north east.... Thyroid disruption" **DBT-Twin** No. BT/471/NE/TBP/2013; My component: 6.75 Lacs; Jan 2015-still continuing.

**Completed as CI:**

9. *As Co-investigator* (in **collaboration** with Dr. Banasri Hazra, Dept. of Pharm. Tech., J.U.): Development of glycosylated derivatives of diospyrin, a plant derived bioactive naphthoquinonoid, for improved anti tumour and anti leishmanial properties in vitro and in vivo.-**DAE** scheme No. 2002/37/19/BRNS/572. Duration 2002-2006.

### 14. Invited lectures (National and International)

1. On the topic 'Studies on Carbohydrate based organogelators and gels' in the 3<sup>rd</sup> CRSI symposium (Kolkata Chapter) held at IIT, Kharagpur on 6<sup>th</sup> August, 2005.
2. On the topic "Umpolung" in the Refresher Course, 2006 organised by the Department of Chemistry, Jadavpur University.

3. On the topic "Carbohydrates in disease management" in the Refresher Course, 2008 organised by the Department of Chemistry, Jadavpur University.
4. On the topic "Asymmetric synthesis" in the Refresher Course, 2008 organised by the Department of Chemistry, University of Calcutta.
5. On the topic "Catalytic Asymmetric reactions" in the Refresher Course, 2008 organised by the Department of Chemistry, University of Calcutta.
6. On the topic "Catalytic Asymmetric reactions" in the Refresher Course, 2009 organised by the Department of Chemistry, Jadavpur University, Kolkata.
7. On the topic "Studies on Carbohydrate Derived Low Molecular Mass Organogelators and the Corresponding Gels" in the symposium NATCOSEB-XIV organized by Department of Chemistry, University of Kashmir during 28-30 July, 2009.
8. On the topic "Umpolung reactivity" in the Refresher Course, 2011 organised by the Department of Chemistry, Jadavpur University, Kolkata.
9. On the topic "Tailor-made amphiphiles based on carbohydrates" in the symposium NATCOSEB-XV organized by Department of Chemistry, Tripura University during 27-29 December, 2011.
10. "Highly Optically Pure Medicinally Potent Heterocyclic Scaffolds Derived From Carbohydrates" in the BIT's 3<sup>rd</sup> Annual "World Congress of Catalytic Asymmetric Synthesis-2012" (WCCAS-2012) at Beijing, China during May 12-14, 2012.
11. "A Journey with Carbohydrates Related to Oligosaccharide Syntheses" in the Satellite International Symposium "Emerging Trends in Glycoscience and Glycotechnology (ETGG)" at IIT, Delhi during January 8-10, 2014.
12. On 'My recent synthetic journey with oligosaccharides related to bacteria' in the 30<sup>th</sup> Carbohydrate Conference (CARBO-XXX) during December 29-31, 2015, in Department of Chemistry, Pondicherry University, India.
13. On 'Synthesis of Oligosaccharides of Bacterial Antigens Utilizing One-pot Glycosylation Reactions' in the symposium Emerging Chemistry and Biology of Carbohydrates (ECBC-2017) during December 18-20, 2017, in the Department of Chemistry, Indian Institute of Technology Kharagpur.
14. On 'Synthesis of Heterocyclic Compounds and Oligosaccharides Utilizing One-Pot Multi component Reactions', in the symposium Recent Advances in Molecules and Materials: RA2M 2018' 2nd – 3rd August 2018.
15. On 'Synthesis of Heterocyclic Compounds and Oligosaccharides Utilizing One-Pot Multi component Reactions' in the National Symposium on Contributions of Women in Science in India (NSCWSI-2018) during 15-16 February, 2018, organized by The Indian Science News Association (ISNA), Kolkata.
16. On 'My research journey with carbohydrate molecules', Professor A.S. R. Anjaneyulu 60<sup>th</sup> Birth Day Commemoration Award Lecture, in the 56<sup>th</sup> Annual Convention of Chemists, Indian Chemical Society, 14-16, November, 2019 at Pt. Ravishankar Shukla University, Raipur.
17. On 'Synthesis of tetrasaccharide derivative related to the cell wall polysaccharide of *B. anthracis* utilizing one-pot glycosylation reactions' in the International Symposium on Green chemistry, ISGC 2019 held from May 13th to 17th 2019 in La Rochelle, France.
18. On 'Asymmetric Synthesis with special reference to catalytic asymmetric reactions' in the Refresher Course on Chemical Sciences: From Concepts to Applications

(RCCHEM2021) in 2021 organised by the Department of Chemistry, Jadavpur University.

## 15. List of Publications:

1. Characterisation of polysaccharides of *Aloe barbadensis* Miller: Part III. Structure of an acidic oligosaccharide, G. Mandal, R. Ghosh, and A. Das, *Indian J. Chem.*, 22B, **1983**, 890.
1. Structure of the  $\beta$ -D-galactan isolated from the pods of *Dolichos lablab* Linn., R. Ghosh and A. Das, *Carbohydr. Res.*, 126, **1984**, 287.
2. Structure of the carbohydrate portion of the sialoglycopeptide isolated from the skin of the fish *M. armatus*, R. Ghosh, S.K. Sikder and A. Das, *Carbohydr. Res.*, 162, **1987**, 257.
3. Structure of a glucan isolated from Tal fruit (*Borassus flabellifer*), R. Ghosh and A. Das, *Indian J. Chem.*, 26B, **1987**, 1059.
4. Conformational and steric requirements of the side chain for sulfur participation in benzthiopyran derivatives, R. Patra, R. Ghosh, S. B. Maiti and A. Chatterjee, *Tetrahedron Lett.*, 30, **1989**, 4279.
5. Structure of the glucan part of a glycopeptide isolated from the native fish Magur (*Clarius batrachus*), M. K. Debnath, R. Ghosh and A. Das, *Indian J. Chem.*, 29B, **1990**, 923.
6. Synthesis of methyl 2-acetamido-2-deoxy-5,6-O-isopropylidene- $\beta$ -D-galactofuranoside, R. Ghosh and N. Roy, *J. Carbohydr. Chem.*, 11, **1992**, 71.
7. Synthesis of tetrasaccharide repeating unit of the antigen from *Klebsiella* type 83, S. K. Das, R. Ghosh and N. Roy, *J. Carbohydr. Chem.*, 12, **1993**, 693.
8. Synthesis of tetrasaccharide related to the repeating unit of the antigen from *Klebsiella* type 55, S.K. Das, R. Ghosh, A.K. Ray and N. Roy, *Carbohydr. Res.*, 253, **1994**, 301.
9. Studies on changes in tumor inhibitory activities through structural modification of a diospyrin derivative. B. Hazra, S. Pal, R. Ghosh and A. Banerjee, *Med. Sci. Res.*, 22, **1994**, 621.
10. *In vitro* antiplasmodial effects of diospyrin, a plant derived naphtha quinonoid and a novel series of derivatives, B. Hazra, R. Ghosh, A. Banerjee, G.C. Kirby, D.C. Warhurst and J.D. Phillipson, *Phytother. Res.*, 9, **1995**, 72.
11. Vanadium (V) in perchloric acid: a novel use of the reagent for dimerisation of some naphthalene derivatives. B. Hazra, S. Acharya, R. Ghosh, A. Patra and A. Banerjee, *Synth. Commun.*, 29, **1999**, 1571.
12.  $\text{InCl}_3$  induced C-glycosylation of per-O-acetylglycals with allyltrimethylsilane. R. Ghosh, D. De, B. Shown and S.B. Maiti, *Carbohydr. Res.*, 321, **1999**, 1.
13.  $\text{InCl}_3$  inorganic synthesis. R. Ghosh, *Indian J. Chem.*, 40B, **2001**, 550.
14.  $\text{InCl}_3$  mediated reactions of aldehydes with allyltrimethylsilane. R. Ghosh, D. De, A. Chakraborty and S. B. Maiti, *Indian J. Chem.*, 41B, **2002**, 1299.
15.  $\text{InCl}_3$ —an efficient Lewis acid catalyst for stereoselective O-glycosidation reactions, R. Ghosh, A. Chakraborty, D. K. Maiti and S. B. Maiti, *Indian J. Chem.*, 41B, **2002**, 583.
16.  $\text{In}(\text{OTf})_3$ —a new efficient catalyst for stereo selective C-glycosylation reactions of glycal derivatives, R. Ghosh, A. Chakraborty and D. K. Maiti, *Synth. Commun.*, 33, **2003**, 1623.

17.  $\text{InCl}_3 \cdot 3\text{H}_2\text{O}$ : An efficient Lewis Acid Catalyst for Stereoselective O-Glycosidation Reactions of per-O-acetyl glycopyrano syltrich loroacetimidates, R. Ghosh, A. Chakraborty and D. K. Maiti, *Indian J. Chem.*, 42B, **2003**, 602.
18. Asimpleone-potsynthesisof $\alpha$ -aminophosphonatescatalysedby $\text{In}(\text{OTf})_3$ ,R.Ghosh, S. Maiti, A. Chakraborty andD.K.Maiti,*J.Mol.Cat.A,Chem.*,210,**2004**,53.
19. Indium triflate: A reusable catalyst for expeditious chemoselective conversion of aldehydes to acylals. R. Ghosh, S. Maiti, A. Chakraborty, and R.K. Halder, *J. Mol. Cat. A, Chem.*, 215, **2004**, 49.
20. Synergistic enhancement of catalytic activity of  $\text{InCl}_3$  -  $\text{Me}_3\text{SiCl}$  combination towards carbon Ferrier Rearrangement in glycal derivatives. R. Ghosh, A. Chakraborty and S.Maiti, *Arkivoc*,**2004** (xiv) 1.
21.  $\text{In}(\text{OTf})_3$ Catalysed one pot synthesis of 3,4-dihydropyrimidin-2(1H)-ones. R. Ghosh, S. Maiti and A.Chakraborty, *J. Mol. Cat. A, Chem.*, 217, **2004**, 47.
22. Facile catalysed acylation of heteroatoms using  $\text{BiCl}_3$  generated *in situ* from the procatalyst  $\text{BiOCl}$  and acetyl chloride, R. Ghosh, S. Maiti and A. Chakraborty. *Tetrahedron Lett.*, 45, **2004**, 6775.
23. Highly Stereoselective synthesis of peracylated  $\alpha$ -aldopyranosyl chlorides from aldopyranose peracetates and thionyl chloride catalyzed by  $\text{BiCl}_3$  generated *in situ* fromtheprocatalyst $\text{BiOCl}$ .R.Ghosh,A.ChakrabortyandS.Maiti,*TetrahedronLett.*,45, **2004**, 9631.
24. Facile catalyzed acylation of alcohols, phenols, amines and thiols based on  $\text{ZrOCl}_2 \cdot 8\text{H}_2\text{O}$  and acetyl chloride in solution and in solvent-free condition. R. Ghosh, S. Maiti and A. Chakraborty, *Tetrahedron Lett.*,46, **2005**, 147.
25. One-pot multi component synthesis of  $\beta$ -acetamido ketones based on  $\text{BiCl}_3$  generated *insitu* from the procatalyst  $\text{BiOCl}$  and acetyl chloride. R. Ghosh, S. Maiti and A. Chakraborty, *Synlett***2005**, 115; *Erratum* 1344.
26. Chiral 2-C-methylene glycosides and carbohydrate-derived pyrano[2,3-b][1]benzopyrans: synthesis via  $\text{InCl}_3$  catalyzed stereoselective Ferrier rearrangement of 2-C-acetoxymethyl glycalderivatives. R.Ghosh, A.Chakraborty, D.K.Maitiand V.G.Puranik, *Tetrahedron Lett.*, 46, **2005**, 8047.
27.  $\text{ZrOCl}_2 \cdot 8\text{H}_2\text{O}$ :An efficient Lewisacidcatalyst for one-pot multi component synthesis of  $\beta$ -acetamido ketones. R. Ghosh, S. Maiti, A. Chakraborty, S. Chakraborty and A. K. Mukherjee, *Tetrahedron*, 62, **2006**, 4059.
28. Crystal or low molecular mass organogel based on sugar-derived chiral pyrano[2,3-b]naphtho[1,3-e]pyrans. R. Ghosh, A. Chakraborty, D. K. Maiti, V. G. Puranik, *Org. Lett.* 8, **2006**, 1061.
29. *syn*-N-[2-Methyl-1-{4-methyl-phenyl}-3-oxo-3-phenyl-propyl]-acetamide:SupramolecularstructureformedbyN-H...O,C-H...OandC-H... $\pi$ (arene)hydrogen bonds.S.Chakraborty,S.Maiti,R.Ghosh,A.K.Mukherjee,*ActaCryst.*,E62,**2006**, 4092.
30. Advances on the use of indium triflatein organic syntheses. R.Ghosh, S.Maiti, *J.Mol. Cat.A. Chem.* 264, **2007**, 1.
31. Bismuth(III) Oxychloride procatalyst based one-pot multi component synthesis of  $\beta'$ -acetamido- $\beta$ -dicarbonyl compounds with special reference to pref- $\beta'$ -acetamido- $\beta$ -oxo esters. R. Ghosh, S. Maiti, S. Ghosh, A. K. Mukherjee. *Synthesis*, **2007**, 190.

32. Synthesis and anti proliferative activity of some novel derivatives of diospyrin, a plant derived naphtha quinonoid. M. Dassarma, R. Ghosh, A. Patra, B. Hazra. *Bioorg. Med. Chem.*, 15, **2007**, 3672.
33. Novel glycoconjugates of diospyrin, a quinonoid plant product: synthesis and evaluation of cytotoxicity against human malignant melanoma(A375)andlaryngealcarcinoma (Hep 2). M. Dassarma, R. Ghosh, A. Patra, R. Chowdhury, K. Chaudhuri, B. Hazra. *Org. Biomol. Chem.*, 5, **2007**, 3115.
34. Synthesis of novel amino quinonoid analogues of diospyrinand evaluation of the irinhibitory activity against murine and human cancer cells, M. Dassarma, R. Ghosh, A. Patra, B. Hazra. *Eur. J. Med. Chem.*, **2008**, 43, 1878.
35. ZrOCl<sub>2</sub>.8H<sub>2</sub>O Catalyzed one-pot multi component synthesis of β'-acetamido-β-dicarbonyl compounds with special reference to *pref*-selective β'-acetamido-β-ketoesters, R. Ghosh, S.Maiti, S.K.Maity, S.Roy. *Synth. Commun.***2008**,38,1958.
36. Aryl 4,6-O-arylidene-1-thio-β-D-glycopyranoside based new organogelators and their gels. S. Roy, A. Chakraborty, R. Ghosh. *Carbohydr. Res.* **2008**, 343, 2523.
37. Synthesis of the repeating trisaccharide unit of the cell wall lipo polysaccharide of E. coli type 8. S. K. Maiti, S. Maity, A. Patra, R. Ghosh. *Tetrahedron Lett.* **2008**, 49, 5847.
38. Use of Cipher and Cipher-Key in Carbohydrate Nomenclature, A. Banerjee, T. Das, R. Ghosh, *J. Ind. Chem. Soc.* **2009**, 86, 963-968.
39. Convergent synthesis of the tetra saccharide repeating unit related to the O-antigenic polysaccharide of *Escherichia coli* 78. S. K. Maity, A. Patra, R. Ghosh, *Tetrahedron*,**2010**, 66, 2809.
40. Tailor-made chiral pyranopyrans based on glucose and galactose and studies on self assembly of some crystals and low molecular weight organogel (LMOG), S. Roy, A. Chakraborty, B. Chattopadhyay, A. Bhattacharya, A. K. Mukherjee, R. Ghosh, *Tetrahedron***2010**, 66, 8512.
41. Synthesis of C<sub>14</sub>- and C<sub>16</sub>- Carbon Chain Containing Mannitol Diester and Diether Based Non-ionic Amphiphiles and Studies of Their Langmuir Monolayer Films at the Air / Water Interface. S. Roy, K. Maity, S. P. Moulik, R. Ghosh. *Coll. Sur. Sci. A.* **2011**, 377, 349.
42. FeCl<sub>3</sub>mediated arylidenation of carbohydrates, N. Basu,S.K. Maity,S.Roy, S.Singha (in part), R. Ghosh, *Carbohydr. Res.* **2011**, 346, 534.
43. Efficient one-pot synthesis of functionalized piperidine scaffolds *via* ZrOC<sub>12</sub>.8H<sub>2</sub>O catalyzed tandem reactions of aromatic aldehydes with amines and acetoacetic esters, S. Mishra, R. Ghosh, *Tetrahedron Lett.* **2011**, 52, 2857.
44. Ecofriendly and sustainable efficient synthesis of bis(indolyl)methanes based onrecyclable Brønsted (CSA) or Lewis (ZrOCl<sub>2</sub>.8H<sub>2</sub>O) acid catalysts. S. Mishra, R. Ghosh, *Indian J. Chem.* **2011**, 50B, 1630.
45. Mechanistic Studieson aNew CatalystSystem (CuI-NaHSO<sub>4</sub>.SiO<sub>2</sub>)Leading to One-pot SynthesisofImidazo[1,2-a]pyridines from Reactions of 2-Aminopyridines, Aldehydesand Terminal Alkynes. S. Mishra, R. Ghosh, *Synthesis***2011**, 3463.
46. K<sub>2</sub>CO<sub>3</sub> Mediated one-pot multicomponent synthesis of medicinally potent pyridine and chromeno[2,3-b]pyridine scaffolds, S. Mishra, R. Ghosh, *Syn. Commun*,**2012**, 42, 2229.
47. Efficient Activation of Thioglycosides with *N*-(*p*-Methylphenylthio)-*s*-Caprolactam-TMSOTf, S. K. Maity, N. Basu, R. Ghosh, *Carbohydr. Res.* **2012**, 354, 40.

48. A Three-Component One-Pot Sequential Synthesis of a Common Tetrasaccharide Block Related to the Lipopolysaccharide of the *Escherichia Coli* O9, *Klebsiella pneumonia* O3 and *Hafnia alvei* PCM 1223, S. K. Maity, R. Ghosh, *Synlett***2012**, 23, 1919.
49. CuCl catalyzed green and efficient one-pot synthesis of aminoindolizine frameworks via three component reactions of aldehydes, secondary amines and terminal alkynes in PEG, S. Mishra, B. Naskar, R. Ghosh, *Tetrahedron Lett.***2012**, 53, 5483.
50. Bio-assay Guided Isolation of  $\alpha$ -Glucosidase Inhibitory Constituents from *Eclipta alba* (L.) Hassk, D. Kumar, R. H. Gaonkar, R. Ghosh, B. C. Pal, *Nat. Prod. Comm.*, **2012**, 7, 989.
51. Trichloroisocyanuric acid (TCCA) – TMSOTf: An efficient activator system for glycosylation reactions based on thioglycosides. N. Basu, S. K. Maity, R. Ghosh, *RSC Adv.* **2012**, 2, 12661.
52. A new triterpenoid saponin from *Glinus oppositifolius* with  $\alpha$ -glucosidase inhibitory activity, D. Kumar, V. Shah, R. Ghosh, B. Pal, *Nat. Prod. Res.* **2013**, 27, 624.
53.  $\alpha$ -Glucosidase and  $\alpha$ -amylase inhibitory constituents of *Carex baccans*: Bioassay guided isolation and quantification by validated RP-HPLC-DAD. D. Kumar, N. Gupta, R. Ghosh, R. H. Gaonkar, B. C. Pal, *J. Functional Food*, **2013**, 5, 211.
54. Trichloroisocyanuric acid (TCCA): An efficient reagent for green activation of thioglycosides towards hydrolysis. N. Basu, S. K. Maity, A. Chaudhury, R. Ghosh, *Carbohydr. Res.* **2013**, 369, 10.
55. Bioactivity guided isolation and quantification of anti-diabetic principle in vitro from *Holarrhena antidysenterica* L. (Wall). D. Kumar, S. Datta, S. S. Roy, R. H. Gaonkar, J. R. Vedasiromoni, R. Ghosh, B. C. Pal, *J. Herbs Spices Med. Plants***2013**, 20, 54.
56. Synthesis of tri- and tetra-mannosides based on sequential one-pot three component glycosylation reactions. N. Basu, M. M. Mukherjee, A. Chaudhury, R. Ghosh, *J. Indian Chem. Soc.***2013**, 90, 1815. [Invited Article. Professor S. K. Talapatra special issue.]
57. Efficient routes toward synthesis of the D-rhamno-trisaccharide related to the A-band polysaccharide of *Pseudomonas aeruginosa*. A. Chaudhury, S. K. Maity and R. Ghosh. *Beilstein J. Chem.* **2014**, 10, 1488. **Invited Article for Thematic issue**
58. Synthesis of the Trisaccharide Related to the Lipopolysaccharide of *Burkholderia sp.* HKI-402 (B4) by Sequential One Pot Glycosylation Reactions. N. Basu, M. M. Mukherjee, R. Ghosh, *RSC Adv.* **2014**, 4, 54084.
59. Comparison of the nature of interactions of two sialic acid specific lectins *Saraca indica* and *Sambucus nigra* with N-acetylneuraminic acid by spectroscopic techniques. Singha, S., Bose, P.P., Ganguly, T., (...), Ghosh, R., Chatterjee, B.P. *J. Luminescence***2015**, 160, 119.
60. Expedient synthesis of the tetrasaccharide cap domain of the *Leishmania donovani* lipopolysaccharide using one-pot glycosylation reactions. M. M. Mukherjee, N. Basu, R. Ghosh, *RSC Adv.***2016**, 6, 45112.
61. Efficient one-pot per-O-acetylation–thioglycosylation of native sugars, 4,6-O-arylidene and one-pot 4,6-O-benzylidene–acetylation of S-/O-glycosides catalyzed by Mg(OTf)<sub>2</sub>, Mukherjee, M. M.; Basu, N. Chaudhury, A; Ghosh, R. *RSC Adv.***2016**, 6, 109301.
62. Iron(III) chloride modulated selective 1,2-*trans* glycosylation based on glycosyl trichloroacetimidate donors and its application in orthogonal glycosylation. M. M. Mukherjee, N. Basu and R. Ghosh, *RSC Adv.*, **2016**, 6, 105589.

63. A target oriented expeditious approach towards synthesis of certain bacterial rare sugar derivatives, A. Chaudhury, R. Ghosh, *Org. Biomol. Chem.*, **2017**, *15*, 1444.
64. Synthetic routes towards acidic pentasaccharide related to the *O*-antigen of *E. coli* 120 using one-pot sequential glycosylation reactions. M.M. Mukherjee, R. Ghosh, *J. Org. Chem.*, **2017**, *82*, 5751. doi: 10.1021/acs.joc.7b00561.
65. Perimidine based selective colorimetric and fluorescent turn-off chemosensor of aqueous Cu<sup>2+</sup>: studies on its antioxidant property along with its interaction with calf thymus-DNA. D. Roy, A. Chakraborty, R. Ghosh, *RSC Adv.* **2017**, *7*, 40563.
66. Coumarin based colorimetric and fluorescence on-off chemosensor for F<sup>-</sup>, CN<sup>-</sup> and Cu<sup>2+</sup> ions, D. Roy, A. Chakraborty, R. Ghosh, *Spectrochim. Acta A: Molec. Biomol. Spectroscopy* **2018**, *191*, 69.
67. Synthetic avenues towards the tetrasaccharide related to *Streptococcus pneumoniae* of serotype 6A. A. Chaudhury, R. Ghosh, *Beilstein J. Org. Chem.* **2018**, *14*, 1095.
68. Carbohydrate Derived Organogelators and the Corresponding Functional Gels Developed in Recent Time, N. Basu, A. Chakraborty, R. Ghosh, *Gels*, **2018**, *4*(2), 52; <https://doi.org/10.3390/gels4020052>.
69. Metal ion sensing ability and photo-physical properties of 4-hydroxy-3-nitroso-2*H*-chromen-2-one: Interaction studies with calf thymus-DNA, D. Roy, L. Haque, S. Das, A. Chakraborty, R. Ghosh, *J. Luminescence*, **2019**, *206*, 474.
70. A metal free mild and green approach for opening of 4,6-*O*-benzylidene acetals to their corresponding 6-*O*-acetyl derivative: Application in the synthesis of a trisaccharide using one-pot glycosylation reactions, M. M. Mukherjee, N. Basu, S. Nandi and R. Ghosh, *Carbohydr. Res.*, **2019**, *476*, 36.
71. An oxidodiperoxido vanadium-based artificial nuclease: DNA binding and cleavage studies, H. Adhikari, R. Ghosh & K. K. Mukherjee, *J. Biomol. Structure Dynamics* **2019**, <https://doi.org/10.1080/07391102.2019.1587514>, published online on 2<sup>nd</sup> April, 2019.
72. FeCl<sub>3</sub> catalyzed tandem synthesis of optically pure sugar based benzimidazoles, S. Mishra, S. Roy, R. Ghosh, D. Dey and B. Hazra, *J. Indian Chem. Soc.* **2020**, *97*, 197-211.
73. One-pot construction of carbohydrate scaffolds mediated by metal catalysts, M. M. Mukherjee, S. K. Maity and R. Ghosh, *RSC Adv.*, **2020**, *10*, 32450-32475.
74. Recent chemical syntheses of bacteria related oligosaccharides using modern expeditious approaches, N. Basu, R. Ghosh, *Carbohydr. Res.*, **2021**, *507*, 108295. **Invited Article for Special Issue.**
75. Synthesis, crystal structure and metal ion sensing ability of novel 4-amino-3-nitroso-2*H*-chromen-2-one: Interaction studies with calf thymus-DNA, D. Roy, R. Puttreddy, K. Rissanen, A. Chakraborty, R. Ghosh, *J. Mol. Str.* **2022**, *1264*, 133334.
76. Recent Advances in Stereoselective Chemical *O*-Glycosylation Reactions, M. M. Mukherjee and R. Ghosh, *Front. Mol. Biosci.* **2022**, *9*, 896187.
77. A Brief Personal Account on Carbohydrates with Special Reference to Recent Syntheses of Oligosaccharides Related to Bacterial Antigens Using One-Pot Glycosylation Reactions, R. Ghosh, *Trends Carbohydr. Res.*, **2023**, *15*, 91-105.
78. A Coumarin-Derived New Chemosensor for Colorimetric and Turn-Off Fluorescent Sensing of Cu<sup>2+</sup>, F<sup>-</sup> and CN<sup>-</sup> Ions: Studies on Its Antioxidant Property, D. Roy, A. Chakraborty, and R. Ghosh, *Chemistry Select* **2023**, *8*, e202204954.

79. Tailor-made pyrazolopyridines and fused pyrazolopyridines: Recent Recent updates toward sustainable synthesis, M. Alam Mondal, R. Ghosh, *Chemistry Select* **2024**, 9, e202402738.
80. The Chemical Synthesis of Oligosaccharides in the Enterobacteriaceae Family, M. M. Mukherjee, N. Basu, S. Poddar and R. Ghosh, in *Synthesis and Applications of Carbohydrates, Lipids, and Steroids*, ed. by A. Nag, 1<sup>st</sup> Ed., CRC Press, Chap. 5, pp. 134–198, 2025 (**Invited Book chapter**).
81. Syntheses of oligosaccharides and the corresponding glycoconjugates towards development of vaccine candidates against invasive *Neisseria meningitidis* strains, *Carbohydrate Res.*, **Invited review** -under revision.

**Proceedings:**

82. Studies on the antiparasitic activities of a novel series of compounds derived from a plant product. B. Hazra, S. Pal, R. Ghosh, P. Ghosh and A. Banerjee, *Proceedings of the International Symposium on Vectors and Vector borne diseases*, Nov. **1999**, p188.