CURRICULUM VITAE

Dr. Swapan Kumar Jana

Personal Details

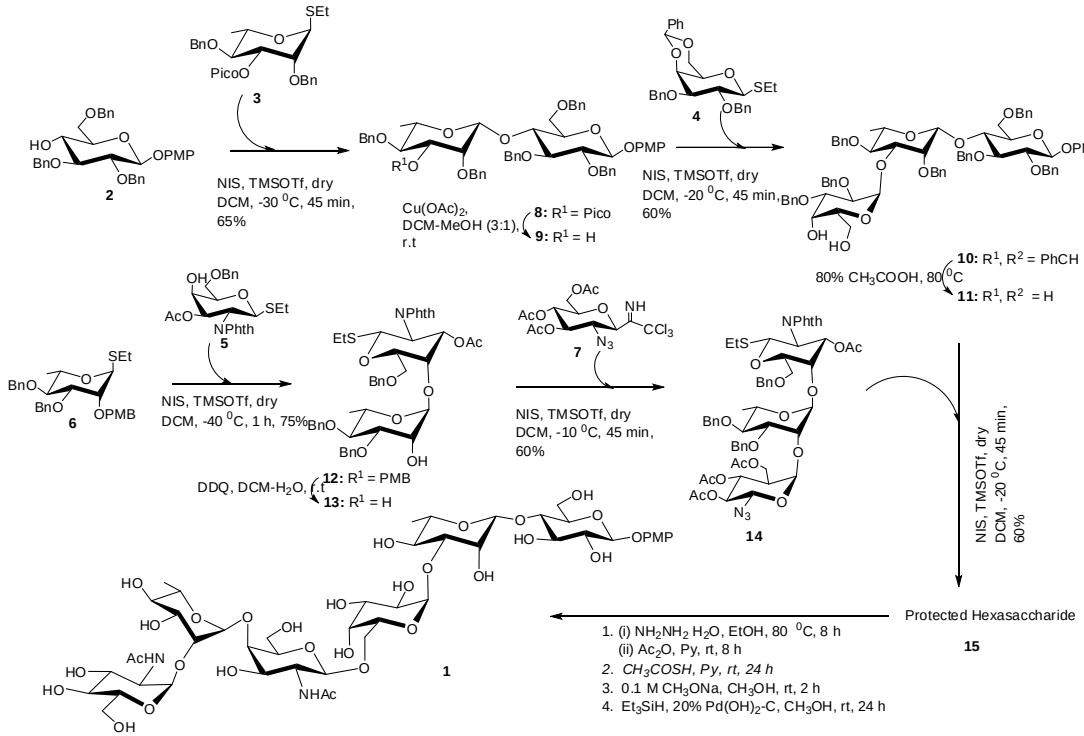
Vill – Dhaipukuria P.O.- Mugberia, P.S.- Bhupatinagar,Dist.- Purba Medinipur, State- West Bengal, Pin no.- 721425, India.
Gender: Male; **Nationality:** Indian
E-mail: icskjana@gmail.com
Ph no: +919732908465

Present Position: Post Doctoral Research Fellow **(June, 2016 – till date)**
Advisor: Prof. Pinakpani Chakrabarti and Prof. Anup Kumar Misra, Bose Institute, India

PostDoctoral Work:

Syntheses of polysaccharide repeating unit of the cell wall of pathogenic bacteria

a) A convergent synthesis of a hexasaccharide corresponding to the repeating unit of the cell wall *O*-antigenic polysaccharide of *Streptococcus pneumonia* strain using a block glycosylation strategy as its *p*-methoxyphenyl glycoside has been achieved. Reported reaction conditions have been used for all glycosylations as well as protective group manipulations. All intermediate steps are high yielding and the glycosylation steps are stereoselective. The multistep synthetic strategy for the synthesis of hexasaccharide is presented below. ***Manuscript submitted 2023.***



b) A concise synthesis of the aminosugar rich pentasaccharide corresponding to the repeating unit of the O-antigen of *E. coli* O142 strain has been achieved using a sequential glycosylation strategy. The yields of the individual glycosylation steps were highly satisfactory with excellent stereo outcome. The multistep synthetic strategy for the synthesis of aminosugar rich pentasaccharide is presented below. ***Synthesis, 2023, 55(05), 773-778.***

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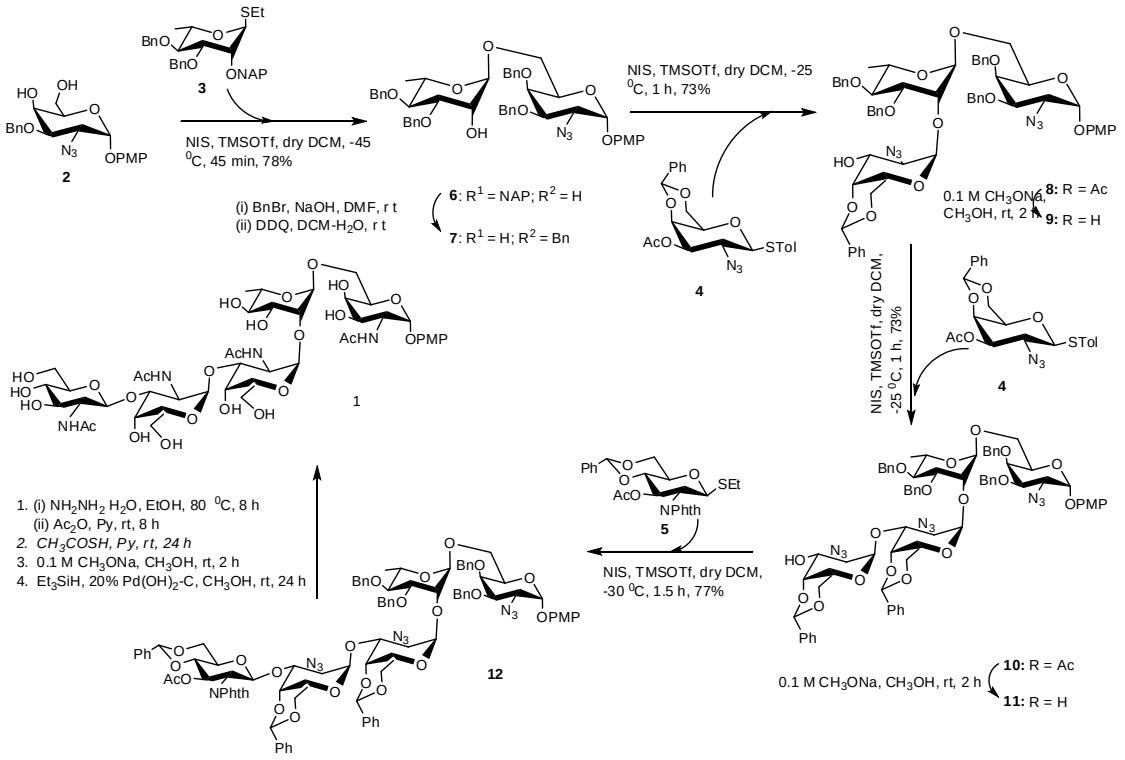
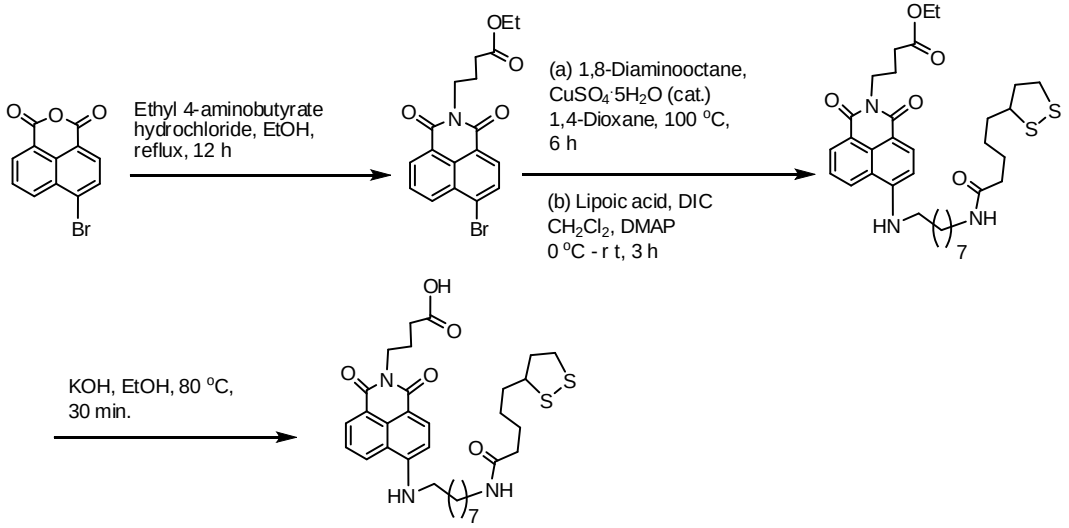
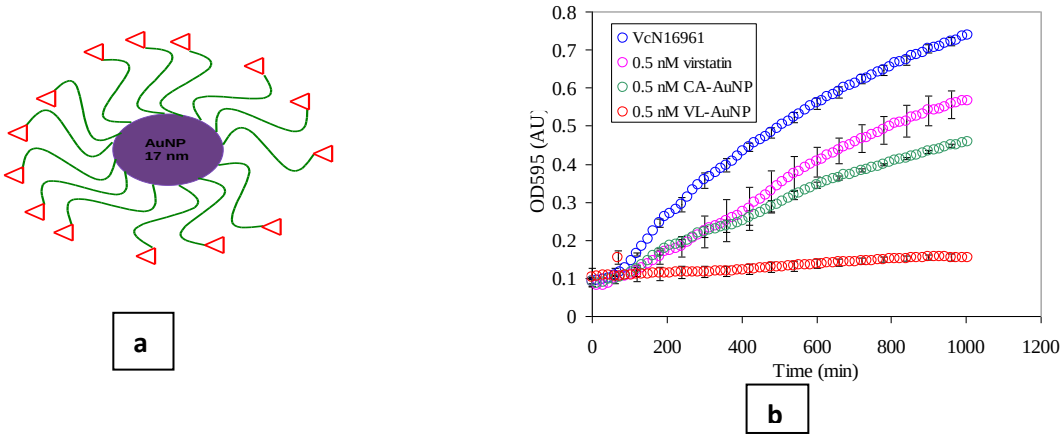


Synthesis of Virstatin-Conjugated Gold Nanoparticle and its Antimicrobial Activity against the Vibrio cholerae. (ACS Appl. Bio Mater. 2021, 4, 3089)

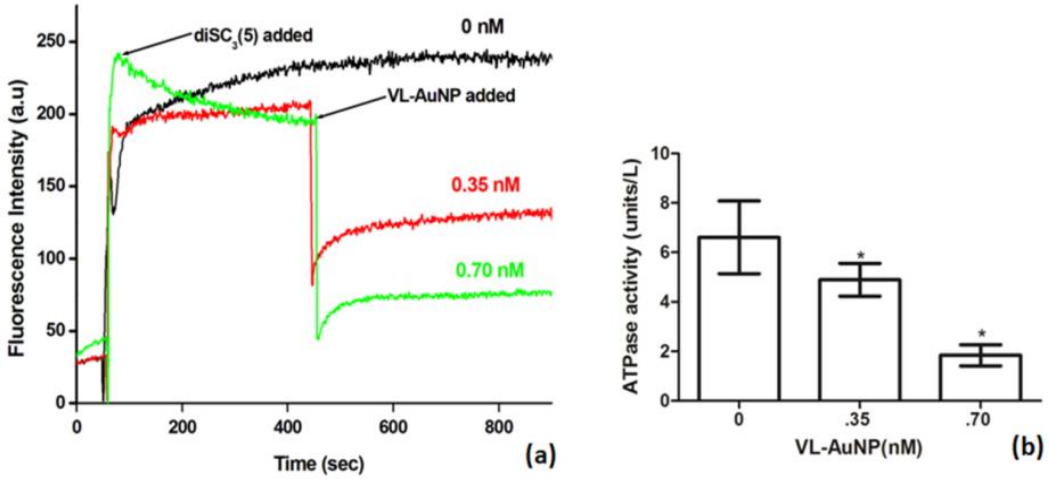
The virstatin derivative (through the following scheme) was synthesised and it was conjugated with gold nanoparticles. The gold nanoparticles were used for study of antimicrobial activity against *Vibrio cholerae*. The multistep synthetic strategy for the synthesis of virstatin-lipoic acid derivative is presented below.



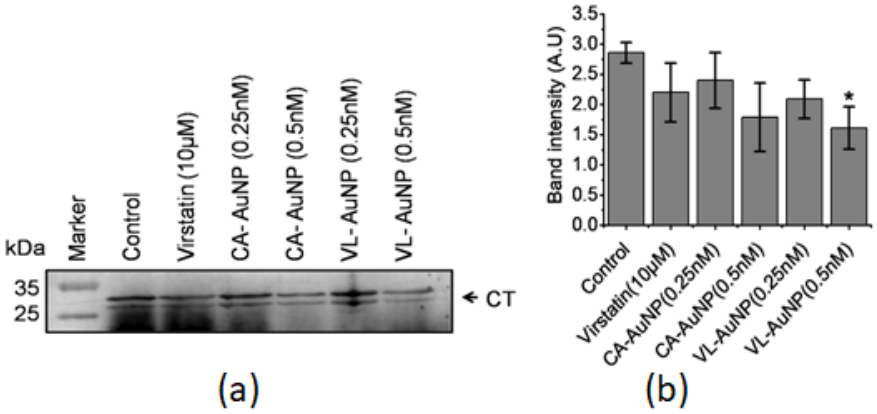
The final compound was used for stabilisation of spherical gold nanoparticles (17 nm) through Au-S interaction. The uniqueness of VL-AuNPs relies in the enhanced antibacterial efficacy compared to virstatin as evident from the inhibitory concentration (IC_{50}) obtained from growth kinetics, and attributed to the inhibition of ATPase activity and DNA damage. More importantly, the expression of cholera toxin, the most important virulence factor of *V. cholera*, is reduced to a far greater extent than by any of the component molecules. The effect of VL-AuNPs on *Vc*N16961 was monitored using various as says such as confocal microscopy, FAC S, fluorescence spectroscopy, etc.



(a) Schematic view of AuNP, (**b**) Growth kinetics of bacteria on its own (control) and in presence of 0.5 nM each of virstatin, CA-AuNP and VL-AuNP. Statistical analysis was performed with one-way analysis of variance (ANOVA) followed by post hoc Dunnett's test (n = 3, p* < 0.05, p** < 0.01).



(a) Effect of VL-AuNP on the membrane potential of *Vc*N16961, using $diSC_3(5)$. The change in fluorescence intensity with time, along with the points of injection, are shown. **(b)** Inhibition of ATPase activity of *Vc*N16961 by VL-AuNPs. Statistical analysis was performed with one-way analysis of variance (ANOVA) followed by post hoc Dunnett's test (n = 3, p* < 0.05).



(a) Immunoblot of CT protein present in the supernatant of the *Vc*N16961 cultures cultivated in the absence (control) and presence of representative concentrations of virstatin, CA-AuNP and VL-AuNP. **(b)** Bar diagram demonstrating summarized quantification of CT expression of **(a)** by Image Lab software. Data correspond to mean ± SEM of three independent experiments, *signifies P<0.05.

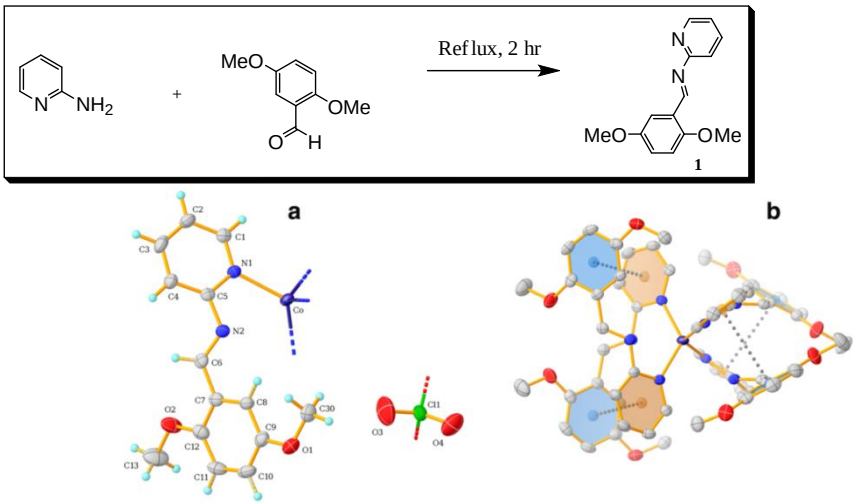
Past Position: Ph.D research fellow **(2011-2016)**

Advisor: Prof. Sudipta Dalai, Department of Chemistry, Vidyasagar University, India

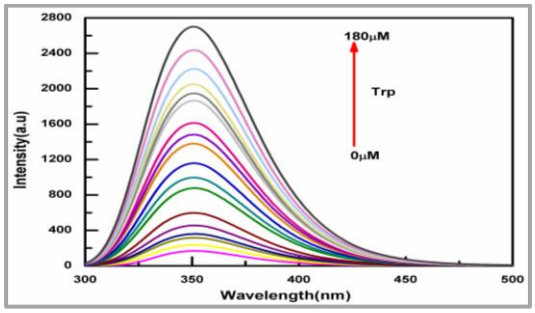
Doctoral Work:

Syntheses of schiff base compound and their application in sensing of metal ions andamino acids

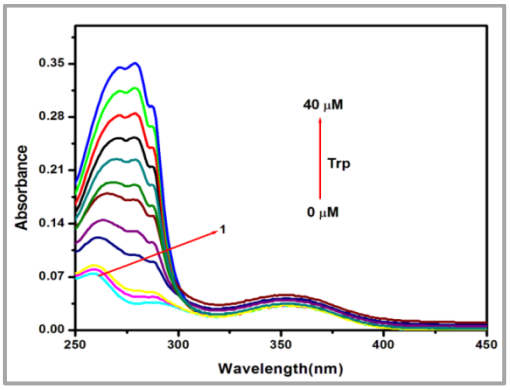
1. A non-toxic, hemocompatible, fluorescent probe as cobalt(II) based complex $[Co(\mathbf{1})_4](ClO_4)_2$ (**2**) (PS: N-pyridylsalicylaldimine) was synthesized using **1** and characterised by single crystal X-ray diffraction studies. The structural analysis revealed that **2** exhibits intramolecular π–π interaction. The recognition ability of **2** towards various amino acids and proteins were studied by UV-vis and fluorescence spectroscopy. The titled complex selectively senses the Trp by reducing its internal fluorescence quenching. It also sense BSA with a detection limit of 56 nM. The binding constant of 1 was analysed by Hill's equation and it was found that it binds to Trp and BSA in the order of 10^3 and 10^4 respectively. ***RSC Advances,* 2016, 6, 95888**



(a) The asymmetric unit of **2**. This is the unique set of refined atoms; (b) The π–π interactions of **2**. The angle between these two planes is 11.416 °.

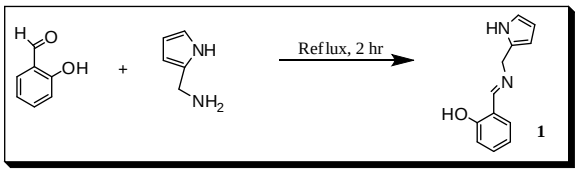


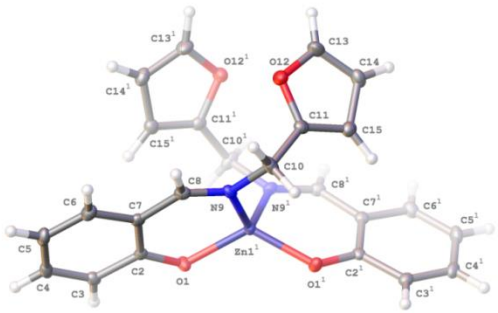
Fluorescence emission spectra of 1 (0.5 μM) upon addition of increasing concentrations of Trp (0–180 μM) in PBS buffer (pH 7.4). The arrow indicates the change in the emission intensity with the increased Trp concentration. λ_{ex} = 290 nm



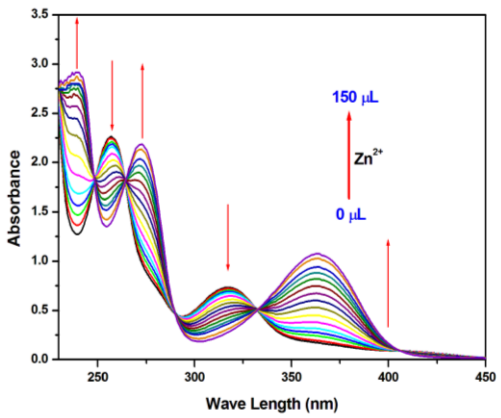
UV-vis spectra of 1 (1 mM) in the presence of increasing amount of Trp (0 to 40 mM) in PBS buffer (pH = 7.4).

2. The recognitionability o f N -Furfurylsalicylaldimine (HL) (**1**) toward various cations (Pb^{2+}, Hg^{2+}, Ba^{2+}, Cd^{2+}, Ag^{+} , Zn^{2+}, Cu^{2+}, Ni^{2+}, Co^{2+}, K^{+}, Sr^{2+}, and Na^{+}) has been studied by UV–Vis and fluorescence spectroscopy. The compound showed highly selective fluorescence signaling behaviour for Zn^{2+} ions in methanol-water medium based on CHEF process and is capable of distinguishing Zn^{2+} from Cd2+ ion. From single crystal Xray analysis it is revealed that a Zn^{2+} ion binds two ligand molecules through imine nitrogen and phenolate oxygen atom. ***Journal of Fluorescence, 2014, 24, 1245***

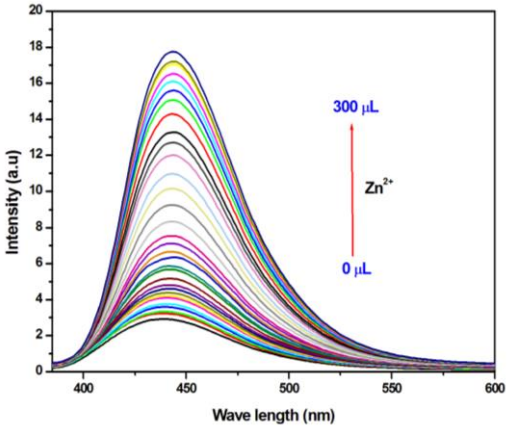




X-ray structure of [Zn(L_2)] (1)



Absorption spectra of receptor in methanol with the increase of $Zn(NO_3)_2$.



Fluorescence spectra of HL in the buffer solution (MeOH:H_2O = 9 : 1, pH=7) in the presence of increasing concentration of $Zn(NO_3)_2$. [HL]=2.0×10^{-5} M and [Zn^{2+}]= 2.0×10^{-4} M, Excitation at λ= 330 nm.

List of Publication:

Total Publication: **24**
Google scholar link- https://scholar.google.com/citations?hl=en&user=HrIBWkkAAAAJ

Major Publications:

1. Swapan Kumar Jana, Pradip Shit, Anup Kumar Misra* *"Concise synthesis of the hexasaccharide repeating unit of the capsular polysaccharide of Streptococcus pneumonia* type 7A strain " ***Manuscript submitted, 2023.***

2. Swapan Kumar Jana, Pradip Shit, Anup Kumar Misra* *"Straightforward synthesis of the pentasaccharide repeating unit of the O-antigenic polysaccharide of enteropathogenic Escherichia coli O142"* ***Synthesis, 2023, 55(05), 773-778.***

3. Swapan Kumar Jana, Arin Gucchait, Susmita Paul, Tultul Saha, Somobrata Acharya, Kazi Mirajul Hoque, Anup Kumar Misra, Barun K. Chatterjee, Tanaya Chatterjee, Pinak Chakrabarti* *"Virstatin-Conjugated Gold Nanoparticle with Enhanced Antimicrobial Activity against the Vibrio cholerae El Tor Biotype"* ***ACS Appl. Bio Mater. 2021, 4, 3089.***

4. Swapan Kumar Jana, Amit Kumar Mandal, Anoop Kumar, Horst Puschmann, Maidul Hossain*, Sudipta Dalai* *"Sensing of tryptophan by a non-toxic Cobalt(II) complex"* ***RSC Advances, 2016, 6, 95888.***

5. Swapan Kumar Jana, Madhusudan Bera, Horst Puschmann, Sudipta Dalai* *"Sensing of Zn^{2+}ion by N-Furfurylsalicylaldimine Based on CHEF Process"* ***Journal of Fluorescence, 2014, 24, 1245.***

Proficiency and Skills:

1. Profound knowledge in handling **inert atmosphere** (Nitrogen/Argon) **techniques and** handling **of moisture sensitive** reagents.

2. Experience in multistep synthetic reactions ranging from **milligrams to preparative scale**.

3. Deep knowledge and experience in purification/separation of mixture of compounds usingtechniques like **column chromatography, Thin Layer Chromatography (TLC).**

4. Good knowledge in the structural elucidation of organic compounds using **NMR, IR, UV-Vis,HRMS, LC-MS/MS and X-Ray**.

5. Well experienced in operating **NMR, IR, UV-Vis** instrument.

6. Basic technical skills in OriginPro, ChemDraw, GaussView and Microsoft Office.

7. Experience in **biophysical techniques** (UV-VIS spectroscopy, fluorescence spectroscopy, circulardichroism, isothermal titration calorimetry)

8. Well knowledge in preparation and running of **DNA agarose gel, 1D & 2D SDS gel**.

9. Deep knowledge and experience in **antibacterial study** (Growth kinetics, colony counting assay,ROS generation study, DNA damage study, membrane fluidity and potential study).

10. Good knowledge of proteomics study of bacteria using **LC-MS/MS**.

11. Experienced in protein expression study by **Western blotting, ELISA**.

12. Good knowledge in cell morphological study by **fluorescence activated cell sorter and confocalmicroscopy.**

13. Basic technical skills in **Cloning, Protein expression, purification involving (gel filtration and FPLCsystems)**.

Teaching Experiences:

1. Supervised twenty five masters' students of Vidyasagar University for M.Sc. dissertation in the Department of Chemistry & Chemical Technology, Vidyasagar University, India.

Awards:

1. Awarded **SERB-NPDF** Fellowship by DST India, 2017.
2. Awarded **Junior Research Fellowship** (in December, 2011) by Council of Scientific and Industrial Research (CSIR), India, 2011.

Educational Details:

Examination	Board/University	Year of Passing	Marks (%)
Doctor of Philosophy(PhD)	Vidyasagar University	2016	-
Post-Graduation	Vidyasagar University	2011	75.67
Graduation	Vidyasagar University	2009	64.25
Intermediate(10+2)	W.B.C.H.S.E.	2006	79.10
Matriculation	W.B.B.S.C.	2004	82.25

I hereby declare that the information furnished above is true to the best of my knowledge.

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