Curriculum Vitae

Dr.Bhushan B. Khairnar

Dr. Khairnar Bhushan B.
Assistant Professor,
Interdisciplinary School of Science (IDSS)
Savitribai Phule Pune University,
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CAREER OBJECTIVE:

Looking for good academic as well as research career in SP Pune University that would Provide me with relevant opportunities to use my skills and expertise in the field of organic Synthesis, and effectively contribute towards the profit of the organization.

EDUCATIONAL QUALIFICATION:

Course	Institute/College	University	Percentage	Year
Postdoctoral fellow (PDF)	University of Florence, Italy	University of Firenze Italy	-	2014
Ph.D. (Synthetic Org Chem)	University of Florence, Italy	University of Firenze Italy	-	2014
Master of Science *(Organic Chemistry)*	Department of Chemistry, University of Pune	University of Pune India	64.74 (A Grade)	2009
Bachelor of Science *(Chemistry)*	K.A.N.M. Sonawane, Arts, Science & commerce college, Satana	University of Pune India	89.00	2007
Higher Secondary School (HSC**)**	K.A.N.M. Sonawane, Arts, Science & commerce college, Satana	University of Pune India	65.83	2004

PROFESSIONAL EXPERIENCE:

I have more than **09** years of research experience in Synthetic Organic Chemistry.

Academic Research experience:-

1) Organization Name: **Department of Chemistry, Nowrosjee Wadia College (Pune), India**

- Post: **Research Associate**. Duration: **July 2018** to **Till Date**.
- Role & Key Responsibilities: Synthesis of targeted molecules such as heterocyclic drug Molecules which show medicinal application under the guidance of Prof. V.V. Chabukswar. Teaching Assistant for postgraduate students (M.Sc I and M.Sc II) to following courses entitled as Basic Organic Chemistry, Organic Chemistry Practical, and Analytical Chemistry Practical Course II. Supervised Students for postgraduate thesis and Laboratory Research.

2) Organization Name: **Department of Chemistry, University of Firenze (Florence), Italy**

- Post: **Post-Doctorate Fellow** (PDF) Duration: **Jan 2014** to **August 2014**.
- Research Topic: Synthesis of targeted molecules such as pyrrolidine and indolizidine polyhydroxylated heterocyclic small natural product to demonstrate the potential of Amino/azido-substituted carbon nanotubes for application in nanomedicine.

3) Organization Name: **Department of Chemistry, University of Firenze (Florence), Italy**

- Post: **Doctorate Fellow** (Ph.D) Duration: **Jan 2011** to **Dec 2013**.
- Research Topic: My Doctorate thesis work was carried out under supervision of Prof. Alberto Brandi, University of Firenze, Italy entitled as 'Stereoselective synthesis of modified lentiginosine as proapoptotic agent'. Synthesis of both series of different derivative of Lentiginosine starting from D- and L-Tartaric acid. Carried out biological activity on different infected human tumor cell line from different origin.

4) Organization Name: **National Chemical Laboratory, Pune, India**

- Post: **Project Assistant II** Duration: **Jun 2009** to **Dec 2010**.
- Research Topic: Total synthesis of natural product named as Indole alkaloid Vincandifformine employing Cycloaddition reaction under supervision of Prof. Ganesh Pandey, National Chemical Laboratory, Pune (India).

5) Organization Name: **National Chemical Laboratory, Pune, India**

- Post: **Master degree project fellow** Duration: **Jan 2009** to **May 2009**.
- Research Topic: - Thesis named as an approach towards the total synthesis of (-) – Aspidospermidine employing intramolecular [3+2] cycloaddition of non-stabilized Azomethine ylide under supervision of Prof. Ganesh Pandey, National Chemical Laboratory, Pune (India).

Industrial Research experience-

1) Organization Name: **Vijayprabha Polymers (Chakan) Pune, India**

- Post: **Research Manager** Duration: **Sept 2016 to June 2018.**

- Role & Key Responsibilities: Research & Development Of different Unsaturated Polyester Resins like GP Resin, ISO Resin, SMC Resin and UV & FR Resin. New Product development and Technology transfer to plant scale. Do marketing for developed product.

2) Organization Name: **Sun Pharmaceuticals Industries Ltd, Gurgaon, Haryana (India).**

- Post: **Research Manager** Duration: **July 2015** to **August 2016**.
- Role & Key Responsibilities: Multistep synthesis of planned molecule antihypertensive drug named as LCZ696. Design and optimization of synthetic schemes. Scale up of advanced intermediate synthesis of LCZ696.Analysis and characterization of the desired products by spectroscopic methods (NMR, Mass, HPLC & IR). Done kilo lab batches and successfully given DQ delivery.

3) Organization Name: **Ranbaxy Research Laboratory, Gurgaon, Haryana (India).**

- Post: **Research Scientist** Duration: **Dec 2014** to **June 2015**.
- Role & Key Responsibilities: Multistep synthesis of planned molecule neprilysin inhibitor named as Sacubirtil. Design and optimization of synthetic schemes. Scale up of advanced intermediate and synthesis of Sacubirtil. Analysis and characterization of the desired products by spectroscopic methods (NMR, Mass, HPLC & IR). Done kilo lab batches and successfully given DQ delivery.

LIST OF PUBLICATIONS:

1) (-)-(1R,2R7S,8aR)-1,2,7-Trihydroxyindolizidine [(-)-7S-OH-Lentiginosine]: Synthesis and Disclosure of its Proapoptotic Activity.
F. M. Cordero, Paola Bonanno, **Bhushan B.Khairnar**, Francesca Cardonna, Alberto Brandi. ***ChemPlusChem* 2012, 77, 224-233**.

2) Copper-Catalyzed Synthesis of a Highly Hydroxy-Functionalized Benzo[*e*]indolizidine by Intramolecular *N*-Arylation.
F. M. Cordero, **Bhushan B.Khairnar**, Paola Bonanno, Andrea Martinelli, Alberto Brandi. ***Eur. J. Org. Chem.* 2013, 4879-4886.**

3) Modular access to highly funtionalised tetrahydroquinolines via Intramolecular Copper-Catalyzed Ullmann Reaction.
F. M. Cordero, **Bhushan B.Khairnar**, Alberto Brand.
***Eur. J. Org. Chem.* 2014, 7122-7133.**

4) Copper-Catalyzed Synthesis of a Highly Hydroxy-Functionalized Benzo[*e*]indolizidine by Intramolecular *N*-Arylation.
F.M.Cordero, **Bhushan B.Khairnar**, Paola Bonanno, Andrea Martinelli, Alberto Brandi.
***ChemInform. 2014,* Volume 45, Issue 1** (DOI: 10.1002/chin.201516230)

5) Modular access to highly funtionalised tetrahydroquinolines via Intramolecular Copper-Catalyzed Ullmann Reaction.
F. M. Cordero, **Bhushan B.Khairnar**, Alberto Brandi.
***ChemInform. 2014,* Volume 45, Issue 1** (DOI: 10.1002/chin.201401177).

6) Cycloaddition of Benzyne with Alkoxy Susbstituted Pyrroline-N-oxides: Unexpected Rearrangement to a N-Phenylpyrrole.
F. M. Cordero, **Bhushan B.Khairnar**, Anna Ranzenigo, Alberto Brandi.
***Syn*Open 2018, 2, 25–29**

LIST OF PATENTS:

1) Solid forms of Valsartan and Sacubirtil. (WO 2017/042700 A1)

2) A solid form of Sacubirtil and Valsartan in salt form. (PCT Filed on Dec 28, 2015)

3) Process for the preparation of Sacubirtil or salts thereof. (WO 2017/141193 A1)

4) A crystalline form of a salt of Sacubirtil and a process of its preparation. (WO 2017/191620 A1)

5) A process for the preparation of a salt of Sacubirtil and Valsartan. (WO 2017/191619 A2)

CONFERENCE AND POSTERPRESENTATIONS:

1) **Bhushan B. Khairnar**, Franca M. Cordero, Alberto Brandi. "Stereoselective synthesis of modified lentiginosine as proapototic agents". *10th Spanish Italian Symposium on Organic Chemistry (SISOC-X),*17-20 July 2014, Florence, Italy, Abstract P-019.

2) **Bhushan B. Khairnar**, Franca M. Cordero, Alberto Brandi "Stereoselective synthesis of modified lentiginosine as proapototic agents". *2nd International Conference on Herbal and synthetic drug studied (HSDS-2014),*10-12 February 2014, Pune, INDIA,Abst P-093

3) F. M. Cordero, **B. B. Khairnar**,C. Vurchio, B. B. Khairnar, A. Brandi, ' Synthesis and Bioactivity of Enantiopure 1,2-Dihydroxyindolizidines", *XXXV National Conference of the Division of Organic Chemistry of the Italian, Chemical Society,*9-13 September 2013, Sassari, Italy, Abstract O-10

4) **Bhushan B. Khairnar**, Franca. M. Cordero, Alberto Brandi, "Synthesis of benzolentiginosine and a new approach to tetrahydroquinoline".*National conference on pericyclic reaction. Synthesis of hetero and carboxylic compound.* 28- 29 June 2013, Perugia, Italy. Abstract C-17

5) Franca. M. Cordero, **Bhushan B. Khairnar**, Andrea Martinelli, Alberto Brandi."Synthesis of benzolentiginosine and a new approach to tetrahydroquinoline". *XXXVIII "A Corbella" Summer School on Organic Synthesis.*17-21 June 2013, Gargnano, Italy

6) Franca. M. Cordero, **Bhushan B. Khairnar**, Alberto Brandi, *XVth Conference on Heterocycles in Bio-organic Chemistry,*27-30 May 2013. Riga, Latvia. Abst. PO. 027

7) **Bhushan Khairnar**. Participate in *PhD Day*[4], *Polo Scientifico,* Sesto Fiorentino, University of Florence, oral Communication entitled as "Synthesis of benzolentiginosine and a new approach to tetrahydroquinoline". 16 May 2013, Florence, Italy, Abstract T-29

8) Franca. M. Cordero, **Bhushan B. Khairnar**, Andrea Martinelli, Alberto Brandi "Synthesis of benzolentiginosine and a new approach to tetrahydroquinoline".*XXXIV Meeting of the Division of Organic Chemistry,* 10th -14th September 2012, Pavia, Italy. Abstracts P-17, P141

9) F. M. Cordero, C. Vurchio, **B. B. Khairnar**, P. Bonanno, A. Brandi "Synthesis of sugar mimetics as new antitumoral agents" *XXXIV Meeting of the Division of Organic Chemistry,* 10th -14th September 2012, Pavia, Italy, Abstract P-16, p140.

10) F.M. Cordero, C. Vurchio, **B. B. Khairnar**, P. Bonanno, A. Brandi "Synthesis of sugar mimetics as new antitumoral agents" *Ischia advanced school of organic chemistry Ischia,*22-26 September 2012, Abstract P-53.

11) **Bhushan Khairnar**, *PhD Day*[3], *Polo Scientifico,* Sesto Fiorentino, University of Florence, Poster presentation entitled as "Stereoselective synthesis of modified lentiginosine as antiviral and proapoptotic agents". 23 May 2012, Florence, Italy,

12) Franca. M. Cordero, P. Bonanno **, Bhushan B. Khairnar**, Alberto Brandi, *XXIV National Congress of the Italian Chemical Society,* 11-16 September 2011, Lecce, Italy. Abstracts p.926.

13) Franca M. Cordero, Paola Bonanno, **Bhushan Khairnar**, Matteo Chioccioli, Paola Gratteri, Alberto Brandi, 'DIVERSITY ORIENTED SYNTHESES OF LENTIGINOSINE DERIVATIVES;*16th European Carbohydrate Symposium (EUROCARB),*3-7 July 2011, Sorrento, Italy Abstract p. 283.

14) *National conference on pericyclic reaction. Synthesis of hetero and carboxylic compound.*27-28 June 2011, Florence, Italy.

RESEARCH INTEREST:

- Synthesis of biologically active molecules, drug intermediates and their applications in medicinal che mistry research.
- Development of newer synthetic methodologies.
- Heterocyclic chemistry, Medicinal chemistry, Natural product synthesis.
- Development of new methodologies for C-C and C-heteroatom bond formation.

PERSONAL DETAILS:

Permanent Address
Pitashree Banglow, Samarth nagar
Bhakshi Road, Satana
Tal- Satana, Dist- Nashik- 423301

Present Address
Flat No: B-906, B Wing
Sara City, Kharab Wadi
Chakan, Pune- 410 501

- **Date of birth:** 01th June 1987
- **Sex:** Male
- **Languages Known:** English, Marathi and Hindi.
- **Marital Status:** Unmarried
- **Nationality:** Indian
- **Hobby:** Reading, Nature gazing, Internet Surfing

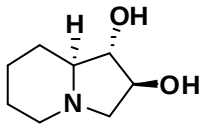
REFERENCES:

Prof. Alberto Brandi. Department of Chemistry University of Florence, Via della Lastruccia 13, I-50019 Sesto Fiorentino (F1), Florence, Italy, E-mail:alberto.brandi@unifi.it	**Prof. Ganesh Pandey.** Director, Centre Of Biomedical Research, Sanjay Ghandi Post Graduate of Medical Science Campus, Lucknow-226014, India. E-mail: gp.pandey@cbmr.res.in
Prof. V.V. Chabukswar. Department of Chemistry Nowrosjee Wadia College, University Of Pune, Band Garden Rd, Sangamvadi, Pune Pune-411001 (M.S), India E-mail: vvchabukswar@gmail.com	**Prof. D. D. Dhavale.** Professor, Department of Chemistry, Post Graduate & Research Center, University of Pune, Pune-07 (M.S.) India E-mail: ddd@chem.unipune.ernet.in

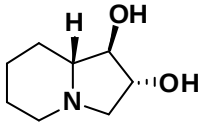
Summary of the Graduate Research (Ph.D work):

Prof. A. Brandi Research Group *University of Florence, Italy.*

Iminosugars are a class of natural products characterized by a polyhydroxylated monocyclic or bicyclic structure containing a nitrogen atom in the ring. These compounds are able to inhibit glycosidases. Among the natural indolizidine iminosugars, (+)-lentiginosine [(+)-**1**] is potent amyloglucosidases inhibitor. In addition an interesting alternative bioactivity of this compound as inhibitor of the HSP90 protein was recently revealed. The bioactivity of the enantiomer (–)-lentiginosine [(–)-**1**]is completely different as proved by its proapoptotic activity against different strains of cancer cells associate with a very low cytotoxicity.



(+)-lentiginosine (1)



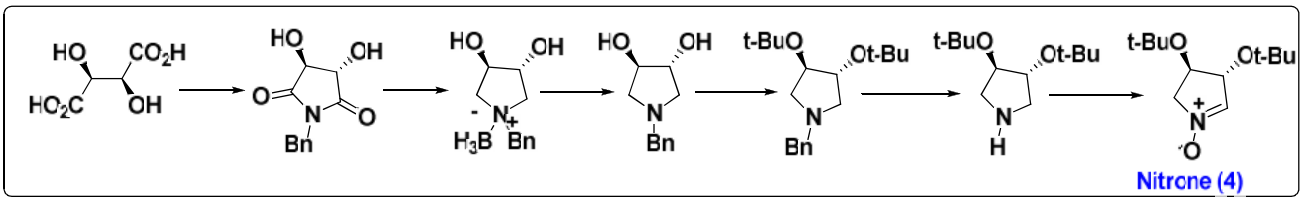
(-)-lentiginosine (2)

Prof. Brandi group from last 30 years involved in 1, 3 dipolar cycloaddition reaction of nitrone with different dipolarophile to synthesize biologically active molecules especially synthesis of Indolizidine iminosugar molecules and itsderivatives. To study and demonstrate the potential of Amino/azido-substituted carbon nanotubes for application in nanomedicine, multiple-decorated oxidized multi-walled carbon nanotubes for drug delivery systems. To check efficiency of multi-walled carbon nanotubes related to length and incubation time.

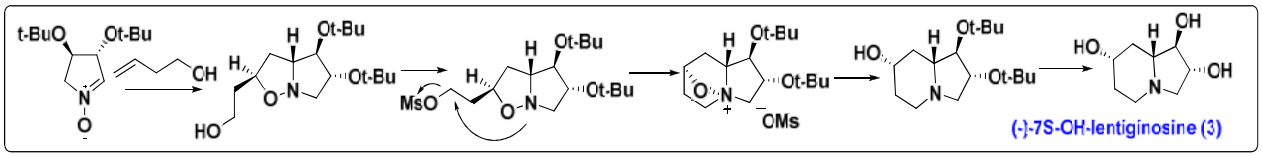
A: Research experience from department of chemistry, University of Florence, Italy
During the Ph.D. [January 2011 – December 2013]

1) Title: **-Revisited synthesis of 3,4-bis-tert-butoxypyrroline N-oxide (Nitrone) and[(-)-7S-OH-Lentoginosine] (3)**

Nitrones are*N*-oxides of an imine and a functional group in organic chemistry. The general structure is $R_1R_2C{=}NR_3{}^{+}O^{-}$, where R_3 is different from H.Nitrones are very reactive species: they exhibit a broad reactivity profile and are recognized as versatile synthetic intermediates. Nitrone synthesized in both the enantiomeric forms starting from the easily available chiral pool compounds L- and D-tartaric acids.



Furthermore (–)-lentiginosine synthesized from Nitrone and it shown interesting bioactivity. In particular this non-natural iminosugar is a potent inhibitor of the HSP90 protein as well as a potent proapoptotic agent against different strains of cancer cells with low cytotoxicity.

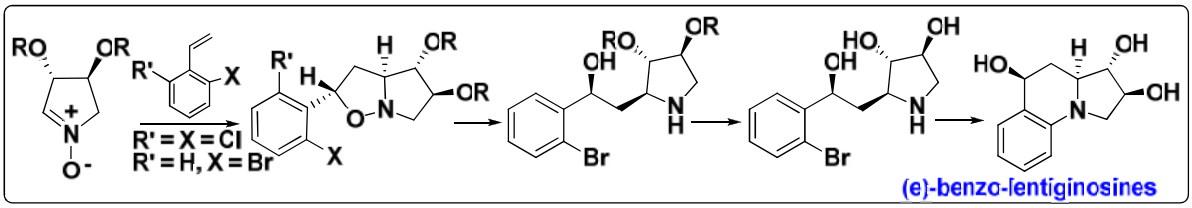


We synthesized a lentiginosine derivative, the 7-OH-Lentiginosine, and disclosed for the first time that it is an interesting proapoptotic agent as its parent compound.

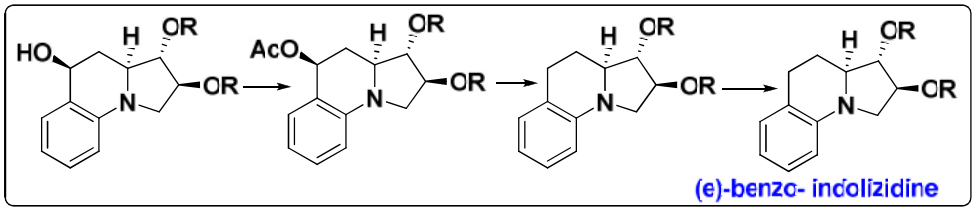
***ChemPlusChem* 2012, 77, 224-233**

2) Title**: -Stereoselective syntheses of (e)-benzo-lentiginosinevia Cu(I) catalyzed intramolecular amination reaction through Ullmann reaction.**

Computational docking studies with glucoamylase, suggest that aromatic ring fused to *e*-bond of lentiginosine could be favorably accommodate in enzyme cavity to increase the affinity of the ligand towords the enzyme, The biological activity of lentiginosine could be increase. This proved after checking biological test.



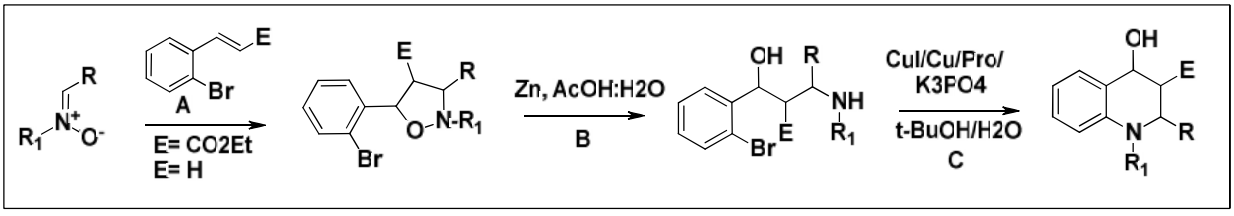
The presence of the OH group on benzylic position renders the compound unstable.In order to avoid this drawback, deprotection of was carried outthen, subjected for intramolecular aryl amination under the best reaction conditions in order to get benzo[*e*]indolizidine**.**



Eur. J. Org. Chem. 2013, 4879-4886

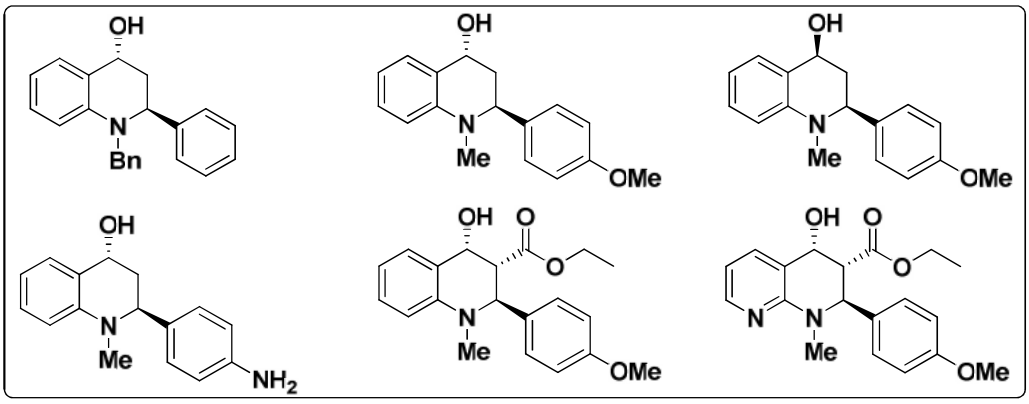
3) Title: - **Developement of new synthetic methodology to Synthesized substitituted tetrahydroquinolines framework as building block for organic synthesis.**

Quinolines framework are important in natural product chemistry as well as in medicinal chemistry, in literature many reports are available to synthesis of quinolines.



In our approach, the three-step sequence 1,3-DC/N-O reduction/N-C intramolecular coupling as a new general approach to tetrahydroquinolin-4-ols starting from acyclic Nitrones.

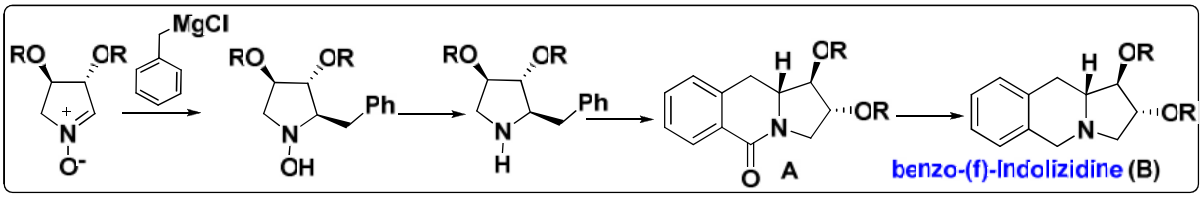
Examples:



Eur. J. Org. Chem. 2014, 7122-7133

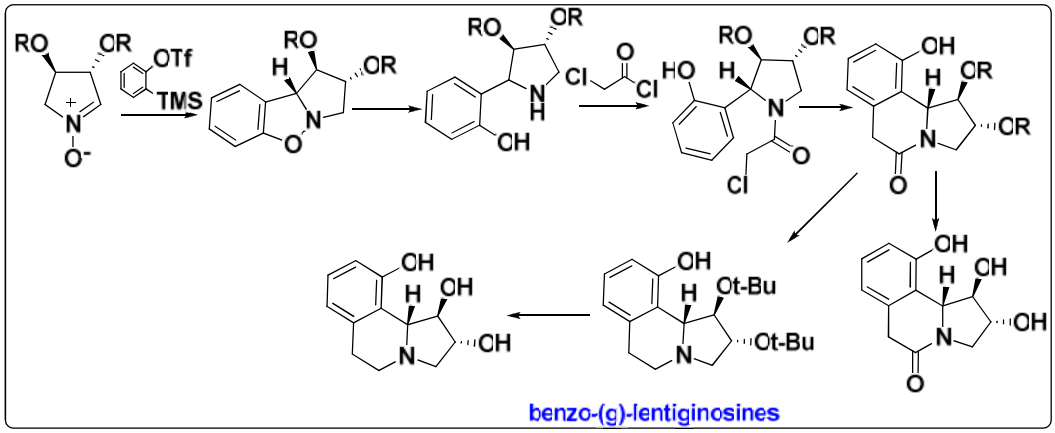
4) Title: **Stereoselective syntheses of benzo-(f)-Indolizidine via metal catalyzed ring closure carbonylation reaction of secondary amine.**

Synthesis of (*f*)-benzo- lentiginosines was completed by alkylation of nitrone with a suitable Grignard reagent followed by hydroxylamine reduction, carbonylation of secondary amines by using metal and deprotection to afforded**A**. Amide reduction of protected and OH-deprotection gave benzolentiginosine **B**.



5) Title: **-Stereoselective syntheses of benzo-(g)-lentiginosines via 1,3-DC of nitrone with benzyne and subsequent ring closure by radical mechanism.**

The possibility of arynes toundergo 1,3-dipolar cycloadditionreactionsdeserve special mention owing to theirability to produce pharmaceutically important nitrogencontaining heterocyclic.Employ aryne strategy for our synthesis of benzo[*g*]lentiginosine via coupling with nitrone.



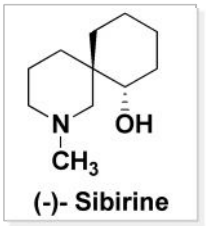
Summary of Research experience:

Prof. Ganesh Pandey Research Group *National Chemical Laboratory (NCL), Pune, India.*

I was involved in following projects under the guidance of **Prof. Ganesh Pandey,** Scientist G and Head, Division of Organic Chemistry and Prasanna kumara (PhD student) in National Chemical Laboratory (NCL) Pune.

B: Research experience from National Chemical Laboratory (NCL), University of Pune, India [January 2009 – December 2010]

Title: **- Stereoselective total syntheses of the Nitraria Alkaloids (-)-Sibirine and (+) - Isonitramine.**



The Nitraria Alkaloids isolated from the plant genus *Nitraria*. These Spiro Alkaloids show neurophysiological activity.

Eur. J. Org. Chem. 2011, 7372

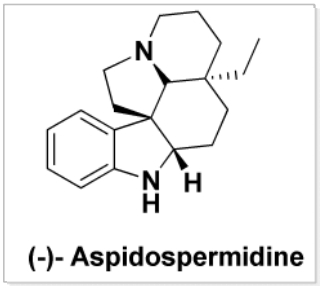
Title: **-The total synthesis of Indole Alkaloid Vincandifformine.**

Vincandifformine was isolated from *Vinca rosea* (Catharanthus*roseus*)in the 1950.Vincandifformine show the Anti-cancer activity. This is such a complex structure Vincandifformine is most effective in treating childhood leukemias and non-Hodgkin's lymphoma.

***Org. Lett.*, 2011, *13* (17), pp 4672–4675**

Master Degree thesis:-

Title: - **An approach towards the total synthesis of (-) - Aspidospermidine employing intramolecular [3+2] cycloaddition of non-stabilized Azomethine ylide.**



(-)- Aspidospermidine

(-)-Aspidospermidine an alkaloid belonging to the family of Aspidosperma indole alkaloids Around 250 compounds belongsto the same family having same basic skeleton it shows the biological activity including antiplasmoidal activity. Syntheses of this compound are very important to organic and medicinal chemistry aspect.

Org. Lett., *2016****, 18 (7), pp 1558–1561***

Declaration:

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

Dr. Bhushan B. Khairnar