3xper Innoventure Limited

Corporate Presentation

August 2026

Our Legacy

Murugappa

- 125 years legacy
- Market cap – US$ 50bn, Revenue – US$ 10bn
- EBITDA – US $ 1.4 bn, PAT – US$ 1bn
- 9 listed companies and >83,000 people
- Financially Stable Indian Business Conglomerate

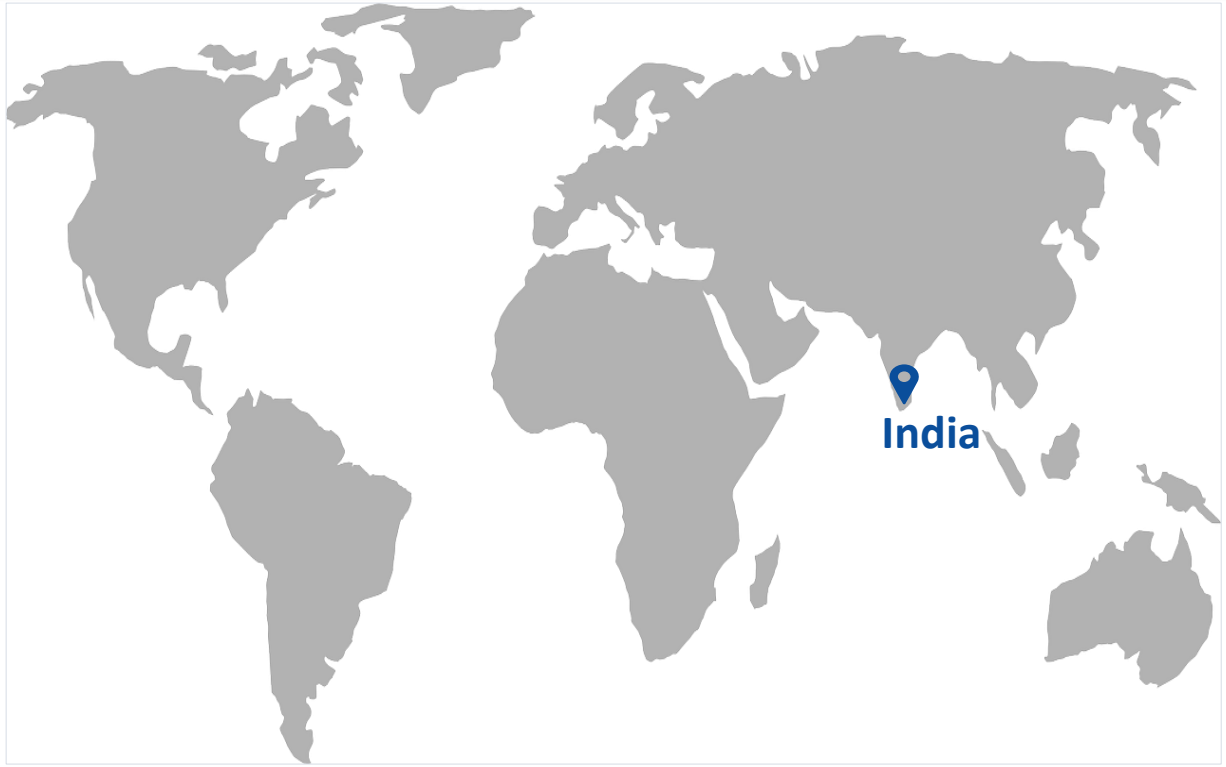
Tube Investments of India (Ltd)

- One of the listed companies of Murugappa group
- Business interests in automobile, financial services, medical devices etc.

3xper

- Subsidiary of TII and part of Murugappa Group
- Strategic expansion to cater global innovator companies covering Pharma and Biotech companies

Our R&D and Manufacturing Locations



- Our R&D facility is spread over 18,000+ sft at TICEL Bio park, an R&D ecosystem located in Chennai, Tamil Nadu India.
- Our green-field manufacturing facility is strategically planned at Naidupeta, Andhra Pradesh, a facility located about 60 miles from Chennai.

Services Overview

3xper offers end-to-end chemistry service offerings providing seamless and efficient solutions across **Early development and manufacturing services.**

Our service offerings across the discovery development continuum

Discovery Chemistry

- Synthetic chemistry
- Analytical chemistry
- Scaffold and Metabolites synthesis
- Random/ Late-stage functionalization
- Synthesis of building blocks, Linkers for ADC

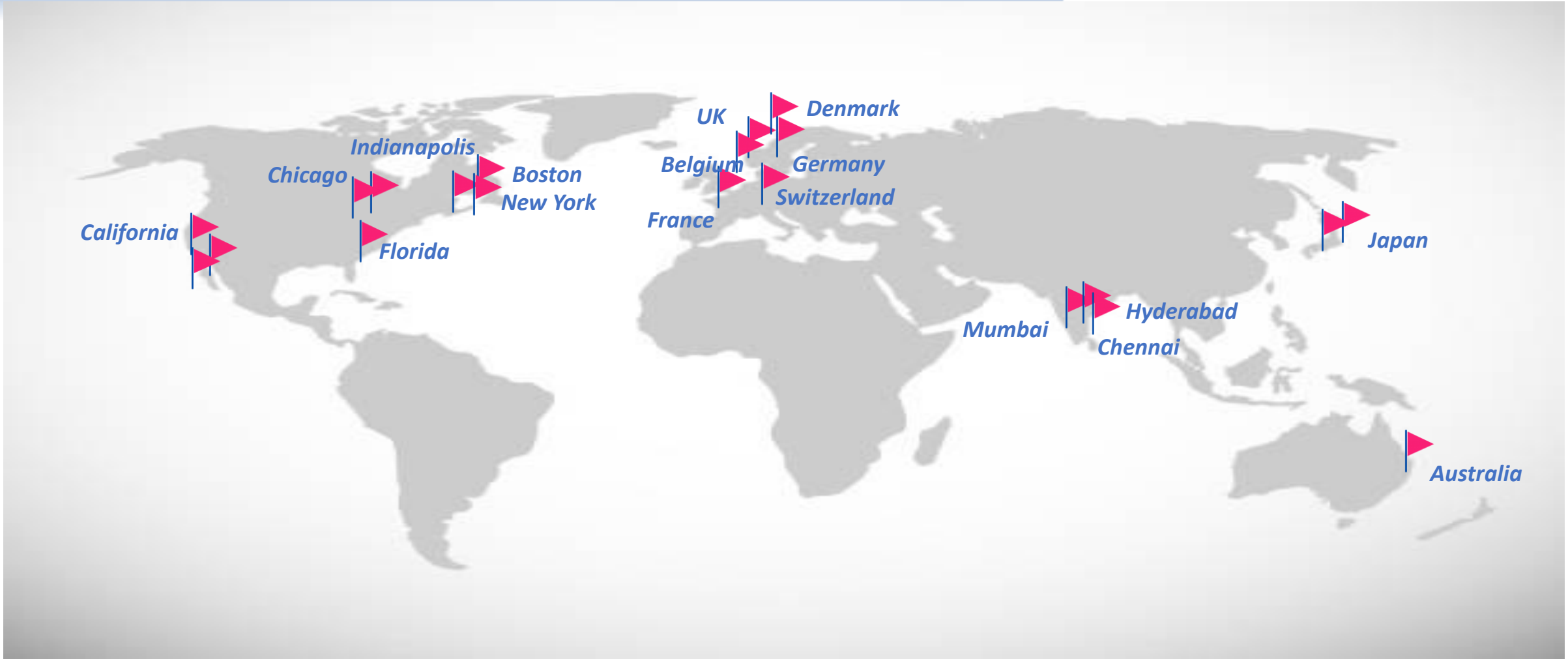
Development Chemistry

- Route scouting, Process development and optimization
- Analytical method development, qualification & validation
- Impurity profiling including nitrosamines
- Continuous manufacturing/ Flow chemistry & Enzymatic transformations
- Synthesis of Key intermediates & starting materials
- Stability studies (Informal/ GMP)
- Development / synthesis of
  - Light sensitive compounds
  - Linkers for ADC

Manufacturing

- Manufacturing of Key Starting Materials, Advanced Intermediates & Drug substances
- Process validation of Intermediates, and Drug substances
- Continuous Manufacturing / Flow chemistry and enzymatic transformations
- Manufacturing of linkers for ADC

Our Global Customer Footprint



Pharma | Biotech | Agrochemicals | Specialty Chemicals | Universities

Facility Accreditations

WHO & Indian GMP Accredited

Sustainability & CSR rated

Compliant with Islamic standards

Meets Jewish dietary laws

Management system

Quality management

Information security

Environmental Management

Cosmetics manufacturing

People- R&D

Initial pool of around 90+ Scientists (MSc / PhD / Post Docs) with extensive experience and expertise in CRO/ CDMO projects

- 60+ Chemists with 5 to 10 years of experience
- 5 Team leads with 10 to 20 years of experience
- 4 Group leaders with more than 20 years of experience
- 20+ Analytical chemist with 5 to 15 years of experience
- 7 Process engineers with 5 to 15 years of experience

Infrastructure

- State-of-the-art facility built at 18,000 sq. ft with dedicated synthetic and analytical labs across four modules.
- 50+ fume hoods with 5 walk-in fume hoods
- Labs equipped with electronic notebooks
- Autoclaves (100mL to 10L) supported with enough safety features with all gas detectors
- MPLCs for quick purifications
- Kilo lab – all glass reactors at 10L & 20L equipped with Huber system to handle temperature range of -90^{o} C to 230^{o} C
- Ideal for material generation, process robustness studies, scale up and crystallization studies

Chemistry Expertise

Metal reactions

- Organometallic reactions
- Target based on low temperature metalation / trans metalation
- Co-ordination complexes

Hazardous reactions

- Azide
- Diazo chemistry
- Peroxide chemistry
- Pyrophoric reaction
- Nitration
- Free radical
- Cyanation reactions
- Strained rings synthesis

Heterocyclic chemistry

- Macrocycles – large ring lactams
- Lanthanide complexes with saturated heterocycles
- Fused rings
- Bioisosters
- Preferential partial reduction of fused heterocycles under high pressure
- Nucleosides
- Nucleotides

Specialty chemistry

- Green chemistry
- Carbohydrates
- Remote C(sp3)–H functionalisation
- Free radical chemistry
- Prodrugs
- Chiral chemistry
- Transition metal catalysed coupling reactions
- Enzymatic reactions
- Flow chemistry
- Late stage Fluorination / Methylation

Analytical R&D Labs- Infrastructure

- 400 MHz NMR
- UPLC/MS (SQD) with AP-ESI/APCI ion sources
- UPLC MS/MS (Triple quad) with AP-ESI/APCI ion sources
- UPLC with DAD & ELSD detectors
- HPLC with VWD, DAD & RI detectors
- GC-MS-FID with Head Space
- GC-FID with Head Space
- GPC-RI
- Preparatory HPLC with open bed fraction collector
- Polarimeter
- FT-IR
- UV

Analytical Services

Method Development & Quantification

- Method development using HPLC, GC, LCMS/MS, GCMS and other spectroscopic techniques.
- Assay analysis
- Method validation,
- Method verification,
- Method transfer as per the ICH guidelines
- Chiral HPLC method development
- Q-NMR assay analysis

Characterization Studies

- Structure elucidation of small molecules using LCMS/MS, GC/MS, 1D and 2D NMR techniques.
- Identification and characterization of trace level impurities.
- Stability studies at different conditions including photo stability testing.

Nitrosamine Studies

- Trace analysis of nitrosamines up to ppb level.
- Quantitative analysis using LCMS/MS triple quad.
- Common nitrosamine and NDSRI analysis as per ICH guidelines

Isolation and Purification

- Milligram to gram level isolation and purification of Achiral and Chiral compounds using preparatory HPLC
- Purity enrichment up to ≥ 99%

Access to Technology Platforms

Continuous Manufacturing

Developed continuous flow processes for two APIs, Isosorbide Dinitrate and Isosorbide Mononitrate. The processes involved nitration and Hofmann rearrangement reactions, respectively, and were successfully scaled up to a 20 L/ min continuous flow system.

Enzyme transformation / Biocatalysis

Collaboration with strategic partner. Expertise in library of enzymes like KRED, IRED, Transaminases, Nitrilases, Transesterases, Nitrile Hydratases, Dehydrogenases. Access to 20,000 library of enzymes. Developed an API (Isosorbide Mononitrate)

Manufacturing Facilities

~100,000+ sq. ft site for manufacturing with multiple scales of operations as below:

	Pilot plant (Non – GMP)	Production Block – 1 (GMP)	Production Block – 2 (GMP)
Total Capacity	483 L	6.1 KL	140 KL
Vessel range	20L to 200L	50L to 1000L	5000L to 25,000L
MOC	GLR, SSR & AGR	GLR, SSR, Hastelloy	GLR & SSR
Temperature range	-20°C to 150°C	-15°C to 250°C	-15°C to 250°C
No of reactors	GLR – 2 Nos, AGR – 2 Nos, SSR – 1 Nos	GLR – 7 Nos, SSR – 6 Nos , Hastelloy – 1 No	GLR – 7 Nos and SSR – 5 Nos
batch size	Up to 10 kg	up to 100 kg	100 kg to 4,000 kg
Downstream equipment	Centrifuge, Driers, ANFD and Nutsche filter	Centrifuges, ANFDs, PNFs, Sparkler filter, VTD & RCVD	Centrifuges, ANF, ANFDs, RCVD
No of clean rooms	-	2	1
Indications	tech transfer projects and scale up supplies	scaleup batches from a few kg up to 100 kg	Commercial supply of intermediate and API batches from 100 kg to 4 MT

Health, Safety & Environment (HSE) Initiatives

3xper is committed to maintaining the highest standards of **health, safety, and environmental protection** across all operations, ensuring a safe workplace and sustainable practices.

Recognized with **EcoVadis Silver** Rating for our performance in **sustainability**, **ethics**, and **responsible business practices.**

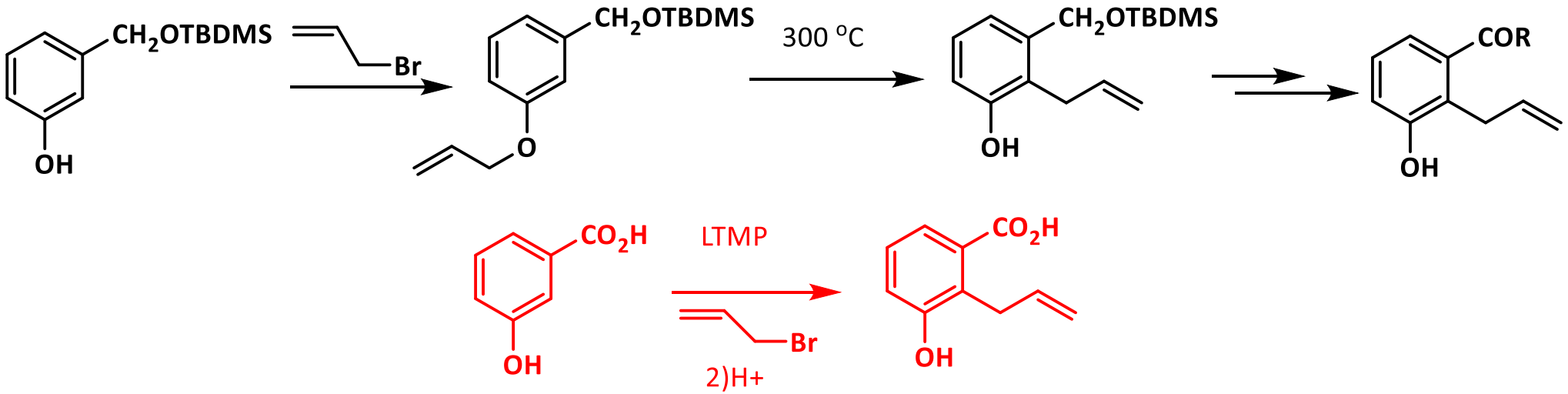
Process Safety & Risk Management	• Comprehensive risk assessments (HAZOP, JSA) across all operations • Implementation of inherently safer processes and continuous hazard evaluation
Occupational Health & Safety	• Zero Harm culture with strict adherence to safety protocols • Regular safety trainings, drills, and competency development programs
Environmental Stewardship	• Adoption of green chemistry and sustainable manufacturing practices • Emission control, solvent recovery, and energy optimization initiatives
Waste & Resource Management	• Minimize, reuse, and recycle approach for waste reduction • Safe handling and disposal of hazardous materials as per regulatory norms
Compliance & Monitoring	• Adherence to global EHS standards and regulatory Compliance • Periodic audits, inspections, and continuous improvement programs
Incident Monitoring & Continuous Improvement	• Systematic reporting, documentation, and root cause analysis of safety incidents • Corrective and preventive actions (CAPA) to prevent recurrence • Continuous monitoring and performance tracking

Confidentiality and Data Integrity

Digital Infrastructure	Our Labs are equipped with electronic notebooks. All data from the experiments will be captured digitally
IP Protection & Ownership	We respect and safeguard intellectual property, ensuring full ownership remains with the client at all stages
Secure Data Handling Systems	Implementation of controlled access, encrypted data storage, and secure communication channels to prevent unauthorized access
Dedicated & Segregated Project Teams	Project teams operate with strict confidentiality protocols, with no cross-sharing of sensitive information across projects
Regulatory & Compliance Adherence	Aligned with global data protection and compliance standards to maintain the highest level of confidentiality and integrity

Chemistry Case Study-1

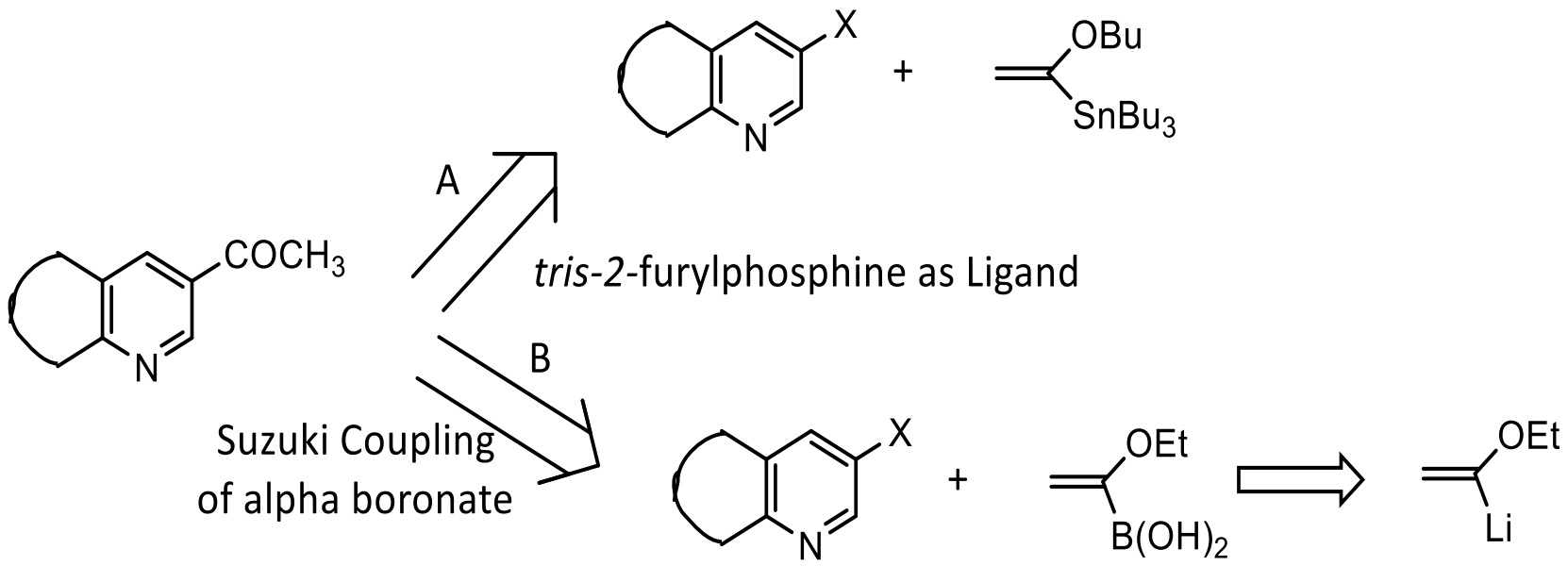
Simplified process for a KRM - Faster turn-around time



- Reported procedure involved high temperature Claisen rearrangement
- Not exclusive and less yielding along with other regio-isomers with chromatographic requirement
- Requires deprotection and low temperature Swern oxidation for the secondary alcohol
- The developed route precluded all these issues and reduced the number of steps by 4.

Chemistry Case Study-2

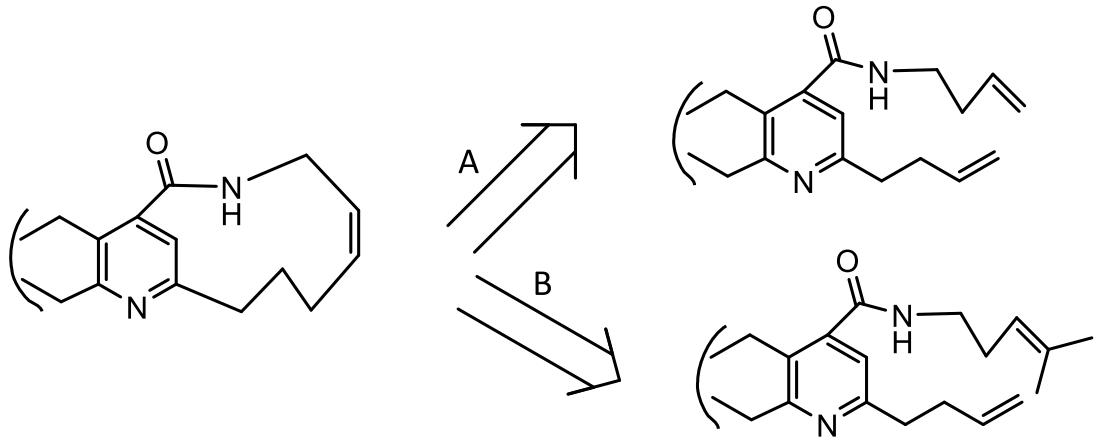
Development of newer route – To overcome non-availability of Key Ligand Issue and avoidance of Tin reagent



- Stille coupling required a special Ligand
- This was not easily procurable, besides exorbitant cost of bulk quantities
- Re-routed synthesis through Suzuki coupling
- Vinyl boronic acid synthesized easily from the cheaper vinyl ethyl ether precursor.

Chemistry Case Study-3

Tricky Macrocyclisation – with the change done as shown in path B, volume of dilution reduced to 75% Conveniently done on multi gram scales



- Grubbs cyclisation was tricky
- At workable concentration of 20-30 V, dimerized product resulted in about 10% yield in addition to polymerized impurities
- Required 100 V dilution to overcome a) Polymerization issues b)20% yield
- Planned differentiation between two ethylene moieties - replacing one of the ethylene group with propylene moiety resulted in good conversion – i.e. 40 % yield at reasonable dilution of 25 V.

Analytical Development Case Study-1

Development of a unified HPLC Method for Impurity Profiling

- A four-step synthesis of the drug molecule resulted in the formation of ~14 related impurities across different stages
- Initial impurity identification required multiple HPLC methods, making the process time-consuming and complex
- To streamline analysis, a single, robust HPLC method was developed.

Key Achievements

- Successfully enabled simultaneous detection and identification of all 14 impurities in each synthesis step
- Provided efficient quantification of the final API along with all related impurities
- Significantly reduced analysis time, cost, and operational complexity
- The developed HPLC method was fully validated as per regulatory guidelines.

Conclusion

The method offers a reliable, efficient, and scalable solution for impurity profiling and routine quality control.

Analytical Development Case Study-2: Characterization of Macrocyclic Compounds & Chiral Isomers

Studied a macrocyclic compound (MW ≈ 900 Da) with high structural complexity

11 chiral isomers were successfully isolated

MS/MS Fragmentation

Identified key fragmentation patterns to differentiated closely related isomers

2D NMR (COSY, HSQC, HMBC, NOESY)

Enabled complete structure elucidation and Confirmed stereochemistry

Conclusion

Combined MS/MS and NMR ensures accurate isomer identification

Analytical Development Case Study-3 : Trace Nitrosamine Analysis

Objective

- Trace analysis of nitrosamine present in (ISMN + Lactose) product
- Complex matrix interfered with trace-level detection
- Detection was challenging due to very low nitrosamine levels
- Existing methods lacked sensitivity and robustness for such matrices.

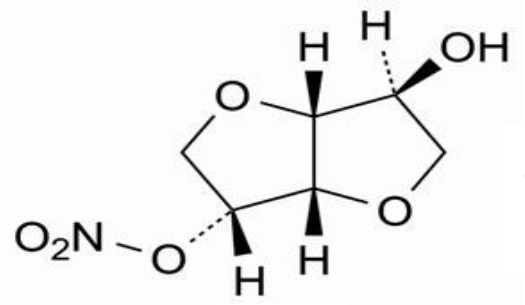
Approach

- Developed a highly sensitive UPLC–MS/MS method for simultaneous quantification of seven nitrosamines
- Matrix interference was significantly minimized through optimization of sample preparation and method conditions
- Successfully validated the method for precision and accuracy at trace levels.

Results

- Achieved LOD ≤ 0.005 ppm and LOQ ≤ 0.011 ppm
- Enabled reliable detection of trace nitrosamines in complex matrices
- Ensured regulatory compliance and enhanced product safety through effective nitrosamine control.

API : Isosorbide mononitrate (ISMN)



(70%)

+ Lactose

(30%)

List of Nitrosamines Studied

- N-nitroso dibutylamine (NDBA)
- N-nitroso diethylamine (NDEA)
- N-nitroso diisopropylamine (NDIPA)
- N-nitroso dimethylamine (NDMA)
- N-nitroso ethyl isopropylamine (NEIPA)
- N-nitroso-N-methyl-4-amino butyric acid (NMBA)
- N-nitroso-N-methyl aniline (NMPA)

Scale-up Case Study: Flow Chemistry-Based Scale-Up of a Nitration Process for API Manufacturing

Problem statement

- Scale-up of a nitration process involving fuming nitric acid required enhanced process safety measures.
- High-volume API market demanding a cost-effective manufacturing process.
- Potential runaway reaction at 71°C with heat generation >453 J/g and pressure >9 bar.
- Compliance with global regulatory and quality accreditation requirements.

Solution offered

- Developed and optimized a continuous flow process using a 10 mL/min flow reactor.
- Achieved an optimal residence time of 0.5 to 1.0 minute, ensuring efficient conversion and process control.
- Enabled operation at 25°C, eliminating the requirement for 0°C processing while maintaining product yield and quality.
- Demonstrated scalable manufacturing capability, with a 200 mL/min flow reactor supporting annual production volumes exceeding 300 MT

Benefits achieved

- Established a safe and highly scalable continuous manufacturing process suitable for commercial production.
- Achieved consistent product quality and reproducible batch-to-batch performance.
- Delivered reaction conversion and product yields comparable to the conventional batch process.
- Significantly enhanced process safety by reducing the reaction inventory from a 2000 L batch reactor to a 200 mL/min continuous flow system.
- Improved overall energy efficiency through optimized operating conditions and process intensification.

Thank you